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When dealing with atmospheric pollution, it is necessary to amass, catalog, sort, evaluate and perform calculations upon large volumes of data. The Air Quality Data Handling System (AQDHS-II) provides air pollution control agencies with the capability to create and maintain their own air quality data bases and to retrieve data and generate reports from those data bases. This report contains step by step procedures for the operation of each program in the system. Each program has sections containing a description, file formats, options, error messages, catalogued JCL (IBM), warnings and special instructions, cost considerations, and related programs and procedures. The report is structured along system functional lines; i.e., file creation and maintenance, data accessing and manipulation, and reports. There is also a section dealing with inter-functional procedures and one which deals with JCL and general topics. The AQDHS-II is compatible with SAROAD and will automatically handle EPA reporting requirements.

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by

Larry R. McMaster, Project Leader

Research Triangle Institute
Research Triangle Park, North Carolina 27709

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EPA Project Officer: Lloyd M. Hedgepeth

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RTI staff members principally participating in the development of this document are:

R. C. Haws, Laboratory Supervisor
L. R. McMaster, Project Leader
D. L. Franke, Analyst/Programmer
D. E. Warren, Analyst/Programmer
W. M. Bailey, Programmer
F. A. Farmer, Programmer
K. C. Ng, Programmer
C. O. Scheper, Programmer
A. F. Tallant, Programmer
H. B. Ashmore, Technical Writer/Editor
D. J. Adams, Secretary
E. A. Hamilton, Secretary
N. L. Kuzil, Secretary
C. S. Lenco, Secretary
D. H. Rachal, Secretary

1.0 INTRODUCTION

1.1 ORGANIZATION

The major functions of the AQDHS-II subsystem are creating and maintaining a valid data base, accessing and manipulating that data base, and producing reports. This User's Guide is structured to reflect these functions, i.e., the programs and procedures in AQDHS-II are documented within these three groupings. The discussions of the AQDHS-II functions and programs comprise Section 4.0 FILE CREATION AND MAINTENANCE, Section 5.0 DATA ACCESSING AND MANIPULATION, and Section 6.0 REPORTS.

Each of these sections contains an introduction which explains the particular function and operating instructions for each of the programs which comprise that function. Flow charts illustrating the operation of the programs are included in each introduction. The program operating instructions consist of a description of the program, the formats of the files accessed by the program, a discussion of program options, and a list of error messages produced by the program. A discussion of the JCL for executing the program, warnings and special instructions, cost estimates, and related programs and procedures are also included.

The programs discussed in Sections 5.0 and 6.0 are grouped into categories according to the specific aspect of the major function which they perform. The categories addressed in Section 5.0 DATA ACCESSING AND MANIPILATION are retrieval, statistical analysis, master file archival and merging, file conversion, and master file sorting. The categories comprising Section 6.0 REPORTS are file listings, EPA-required reports, and summary reports.

In addition to these program sections, this User's Guide includes sections which provide information necessary for full utilization of AQDHS-II. Section 2.0 OVERVIEW OF AQDHS-II provides a brief discussion of the subsystem, explains the program design, and provides a system flowchart. Section 3.0 ECONOMICS discusses the cost of installing and operating AQDHS-II as well as ways to reduce these costs. Section 7.0 INTER-FUNCTIONAL PROCEDURES describes sample run streams which execute programs from more than one functional area, such as producing a report from a retrieved answer file. Section 8.0 JCL AND GENERAL TOPICS discusses the IBM JCL used in the AQDHS-II cataloged procedures and explains the installation and updating processes. Additional information concerning the operation of AQDHS-II is included in the five appendices. An index is provided to aid the user in finding all the information contained in the User's Guide.

Seven-letter names are used for all programs in AQDHS-II. The first position contains an 'A' for AQDHS-II, positions 2 and 3 contain a function indicator (see Figure 1.1-a), and positions 4 thru 7 contain information relating to the file used or type of report. Each program is also assigned a program number prefixed by 'AQ'. See Figure 1.1-b for a list of program names, numbers, and descriptions.

The cataloged procedures all have seven-character names. The first two characters are 'AQ', then positions 3 and 4 contain the function indicators (See Figure 1.1-a), position 5 provides information on the file used (See Figure 1.1-c), and the last two charcters are numeric. See Figure 1.1-d for a list of procedures.

Code	Description
CV	Conversion
CE	Conversion and Edit
ED	Edit
EM	Edit Maintenance
FM	File Maintenance
MS	Miscellaneous
RP	Report
RT	Retrieval
SR	Sort
ST	Statistical

Figure 1.1-a. Function Indicators

Program Name	Program Number	Description	Reference	Page Number
ACVANOM	AQ0040	Anomaly Screening Master File Conversion	5.5.5	377
ACVMFOR	AQ0020	Master File COBOL to FORTRAN Format Conversion	5.5.3	360
ACVPFOR	AQ0030	Parameter File COBOL to FORTRAN Format Conversion	5.5.4	369
ACVSARD	AQ0010	SAROAD to AQDHS-II Conversion	5.5.2	339
ACVUNIT	AQ0050	Units Code Conversion	5.5.6	392
AEDMSTR	AQ0060	Master File Transaction Edit	4.5.1	120
AEMPARM	AQ0070	Parameter File Maintenance	4.2.2	51
AEMSITE	AQ0080	Site File Maintenance	4.3.2	84
AEMSTND	AQ0090	Parameter Standards File Maintenance	4.4.2	103
AFMMSTR	AQ0100	Master File Maintenance	4.5.3	161
AMSARCH	AQ0215	Master File Archival	5.4.3	323
AMSMERG	AQ0210	Master File Merge	5.4.2	315
ARPANOM	AQ0320	Anomaly Screening Report	6.4.3	547
ARPDUMP	AQ0310	Master File Formatted Dump	6.2.2	437
ARPINVP	AQ0290	Inventory by Pollutant Report	6.4.5	587
ARPINVS	AQ0280	Inventory by Site Report	6.4.4	575
ARPMSBR	AQ0300	Master File Summary Report	6.4.6	598
ARPMSST	AQ0270	Statistical Report	6.4.2	525
ARPMSTR	AQ0230	Master File Detailed Report	6.2.3	445
ARPPARM	AQ0240	Parameter File Detailed Report	6.2.4	478

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Figure 1.1-b. AQDHS-II Programs

Program Name	Program Number	Description	Reference	Page Number
ARPPMEX	AQ0330	Parameter Exception Report	6.4.7	606
ARPSARD	AQ0220	AQDHS-II to SAROAD Conversion	6.3.2	501
ARPSITE	AQ0260	Site File Detailed Report	6.2.6	492
ARPSMEX	AQ0340	Site Exception Report	6.4.8	617
ARPSTND	AQ0250	Parameter Standards File Detailed Report	6.2.5	485
ARTGENR	AQ0120	Generated Retrieval Program	5.2.3	253
ARTLNGP	AQ0110	Retrieval Language Processor	5.2.2	199
ASRINTR	AQ0130	Master File Internal Transaction Sort	4.5.2	156
ASRMSTR	AQ0140	Master File Sort	5.6.2	407
ASRPARM	AQ0150	Parameter File Transaction Sort	4.2.1	46
ASRSITE	AQ0160	Site File Transaction Sort	4.3.1	79
ASRSTND	AQ0170	Parameter Standards File Transaction Sort	4.4.1	98
ASTMSST	AQ0200	Statistical Analysis	5.3.3	282
ASTPRLM	AQ0190	Preliminary Statistics	5.3.2	273
ASTSLAV	AQ0180	Sliding Average	5.3.4	290

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Figure 1.1-b - Continued. AQDHS-II Programs

Code	File
D	Parameter Standards File
M	Master File
P	Parameter File
S	Site File
T	Transaction

Figure 1.1-c. File Code

Procedure	Description	Reference	Page Number
AQCVM10	Master File COBOL to FORTRAN Format Conversion	5.5.3.5	361
AQCVM20	Units Code Conversion	5.5.6.5	395
AQCVP10	Parameter File COBOL to FORTRAN Format Conversion	5.5.4.5	370
AQCVT10	SAROAD to AQDHS-II Conversion	5.5.2.5	342
AQEDT10	Master File Transaction Edit	4.5.1.5	136
AQEMD10	Parameter Standards File Maintenance	4.4.2.5	106
AQEMM10	Master File Edit Maintenance	4.6.1	186
AQEMP10	Parameter File Maintenance	4.2.2.5	60
AQEMS10	Site File Maintenance	4.3.2.5	86
AQFMM10	Master File Maintenance	4.5.3.5	167
AQMSM10	Master File Merge	5.4.2.5	316
AQMSM20	Master File Archival	5.4.3.5	324
AQRPD10	Parameter Standards File Detailed Report	6.2.5.5	485
AQRPM05	AQDHS-II to SAROAD Conversion	6.3.2.5	503
AQRPM10	Statistical Analysis Report	6.4.2.5	529
AQRPM20	Master File Detailed Report	6.2.3.5	452
AQRPM25	Master File Formatted Dump	6.2.2.5	438
AQRPM30	Master File Summary Report	6.4.6.5	598
AQRPM35	Inventory by Site Report	6.4.4.5	577
AQRPM40	Inventory by Pollutant Report	6.4.5.5	589
AQRPM45	Anomaly Screening Report	6.4.3.5	555
AQRPP10	Parameter File Detailed Reort	6.2.4.5	578
AQRPP20	Parameter Exception Report	6.4.7.5	608
AQRPS10	Site File Detailed Report	6.2.6.5	492

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Figure 1.1-d. AQDHS-II Catologed Procedures

Procedure	Description	Reference	Page Number
AQRPS20	Site Exception Report	6.4.8.5	619
AQRTM10	Retrieval	5.7.1	421
AQRTM20	Retrieval (Generate and Store Program)	5.2.2.5	222
AQRTM30	Retrieval (Execute Stored Program)	5.2.3.5	255
AQSRM10	Master File Sort	5.6.2.5	409
AQSTM20	Sliding Average	5.3.4.5	297

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Figure 1.1-d - continued. AQDHS-II Catologed Procedures

1.2 DEFINITIONS OF TERMS AND CONVENTIONS

ABORT:

The termination of a job due to a malfunction. Any condition that causes an abort error message in any of the AQDHS-II programs will cause the execution of that program to be terminated immediately but will allow any successive programs in the same run stream to be executed; however, the results of any such programs are probably invalid. Programs may also abort with a system error message. In this case, no successive programs will be executed.

Action Code:

An AQDHS-II master file field. See Figure 4.5.1-b and Section 4.5.3.2 for a complete description. Also a parameter file transaction field (see Figure 4.2.2-b).

Agency Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

ANS (ANSI):

An acronym for the American National Standards Institute, which establishes the standards for the COBOL and FORTRAN languages.

Answer File:

A file that is either (1) produced by a (non-batched) retrieval without the SLIDING option and is a subset of the records on the master file, (2) produced by a set of batched retrievals without the SLIDING option and is a group of subsets of the records in the master file, or (3) produced by the units code conversion program and consists of records from the master file with readings expressed in different units than in the master file. An answer file may be input to any program that uses the master file for the purpose of generating reports; however, an answer file may contain duplicate records and may not be in the normal master file order. See Sections 5.2, 5.5.6, and 5.6. Note: an answer file should not replace the master file for file maintenance purposes. Also, see sliding average answer file and standard answer file.

AQDHS-II:

The Air Quality Data Handling System is a sub-system of CDHS. It provides a systematic method for collecting large volumes of atmospheric pollution data and storing it in a data base that will provide a central source for the information.

AQCR Code:

The Air Quality Control Region is an AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Area Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Baseline:

A version of the AQDHS-II system maintained by NADB. All installation and update copies are made from the baseline. If local modifications are made to AQDHS-II, it is recommended that a copy of the baseline be maintained. Only the baseline AQDHS-II is supported by NADB.

Batched Retrievals:

When more than one retrieval is processed in one execution of the AQDHS-II retrieval programs, the retrievals are said to be batched.

Block:

A group of records handled by the computer as a single unit. The size of a block should be set to take best advantage of the size of a track if the file is to be stored on disk.

Blocking Factor:

The number of records in a block. Information on the blocking factors for the files in the AQDHS-II system can be found in Appendix E.

Card:

A punched card used to enter data into the computer. The 80-column card is used for AQDHS-II. Each column of a card is used to enter a single numeric or alphabetic character and one card is used for a single transaction. Transactions may be entered by other methods that do not use cards, but the term card is still used to denote a transaction.

Catalog:

A table of descriptive information for files, such as unit, volume, and DCB information, which is maintained by the computer. A cataloged data set may be used by specifying its name and disposition.

Cataloged data set:

A data set that has been listed in the system catalog of files. Items such as unit, volume, and DCB information for the data set are contained in the system catalog.

CDHS:

Comprehensive Data Handling System (CDHS) is comprised of AQDHS-II and EIS/P&R (Emission Inventory System/Permits and Registration).

COBOL:

An acronym for COmmon Business Oriented Language. It is an internationally accepted programming language used for systems which handle large data bases. The statements are English-like but must comply with rules established for the language. A majority of the programs in AQDHS-II are written in COBOL.

Composite Data:

Records containing information resulting from analyses of a solution containing a number of individual samples that have been chemically combined. Used for hi-vol particulate functions.

Composite Number of Samples:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Composite Period:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Composite Time Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Composite Type:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Compile:

To create an object module from source language statements by means of a compiler. While some compilers generate object modules which contain machine code that can be executed directly, most generate code which must be further processed by a linkage editor to produce an executable load module. In most AQDHS-II installations, the linkage editor is used.

CONDITIONAL:

A type of error message generated by programs in AQDHS-II. Conditional errors are not serious enough to cause rejection of the input data, however the message cannot be suppressed.

Control Card:

A card entered to provide specific instructions to a program. Used interchangeably with option card.

County Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Cylinder:

Used in allocating space on a direct access device (disk). As a unit of measure, it contains several tracks, the exact number being dependent upon the type of disk.

Data:

A general term used to describe the elements of information that can be processed by a computer. Data is used to describe all the information collected and stored for AQDHS-II.

Data-field:

Used in AQDHS-II to signify a reading. See Reading.

Data Set:

A file used by the computer. Data sets may be stored on disks or tapes. Partitioned data sets are used as libraries to store a collection of programs or procedures.

Day:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Decimal Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Deck:

A collection or pack of punched cards. The cards necessary to run a job, including JCL, option cards, and transactions, form a deck.

Diagnostic Report:

A report printed during the execution of most programs in AQDHS-II. The report contains the update messages, information on the options used for the program, messages explaining errors encountered during the execution of the program, and run statistics indicating the number of records processed and the number of errors found. Those AQDHS-II programs that do not produce a separate diagnostic report contain the information normally included in a diagnostic report at the beginning and end of other printed output.

DISASTER:

A type of error message printed by AQDHS-II programs. Execution of the program will be terminated immediately when a disaster condition is encountered, but other programs in the same run stream will be executed and produce unpredictable results. The user should contact NADB for information on recovering from a disaster condition.

Disk:

A flat circular plate upon which data may be stored by a magnetic process. Also may be called a magnetic disk. In large computer systems, one or more magnetic disks are mounted on a spindle and form a disk pack. Each disk is divided conceptually into tracks, and tracks are combined into cylinders. Space may be allocated by tracks or cylinders. A disk is a direct access device.

Error Message:

In AQDHS-II, the term is used two ways. First, it is used as a general term to include all types (WARNING, CONDITIONAL, ERROR, ABORT, and DISASTER) of messages printed when an error is encountered by a program. Further information on errors can be found in Appendix B. Secondly, it refers specifically to messages prefaced by the word ERROR which indicate that input data has been rejected due to the error found, but that processing will continue.

Execute:

To perform the operations specified by a particular program or procedure.

Field:

A subdivision of a record containing a particular item of data. Generally, several characters of information are grouped together to form a field. Examples of fields in AQDHS-II include state code, parameter code, and start hour.

File:

An organized collection of related records. One or more files may be on a tape or a disk. The records in a file are usually sequenced by some key contained in the records. Files may be stored for future use (permanent) or used by only one job (temporary). Permanent files used by AQDHS-II include the master file, the parameter file, the site file, and the parameter standards file.

Form Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Format:

A specified or predetermined arrangement of data on a record or document synonymous with layout. Formats given for the files in AQDHS-II include the position, length, and description of each field.

FORTRAN:

Acronym for FORmula TRANslator. A programming language designed primarily for the solution of mathematical and scientific problems. Used in AQDHS-II for programs which calculate statistical information such as standard deviation and geometric mean.

Hardware:

The physical equipment making up a computer system. Hardware includes printers, disk and tape drives, terminals, and the central processing unit of a computer.

Installation:

Two definitions are used by AQDHS-II. The first pertains to the initial preparation needed when setting up the AQDHS-II system for the first time. The second refers to a particular computer system, the people who operate and use it, the work it does, and the place where it is located.

Internal Transaction:

A record created by the master file transaction edit program and used by the master file maintenance program to update the master file. These records are not 80 columns in length and are not interchangeable with punched cards used to enter transactions.

JCL:

Job Control Language. A programming language used to identify a job and describe its requirements to the operating system. Information on JCL can be found in Section 8.1.

Job:

A unit of work entered into the computer by means of a single run stream containing a single job card. A job consists of one or more procedures or programs.

Key:

One or more fields within a record used to identify or control that record. Keys are used by AQDHS-II both to sequence files and to match transactions with file records when updating a file.

Library:

An organized set of programs or files. In AQDHS-II, partitioned data sets are used as libraries to store source programs, load modules, and procedures.

Link Edit:

To combine object modules into an executable load module. In AQDHS-II, all programs are link edited after being compiled, and the resulting load modules are stored in a load library.

Load Module:

The output of a linkage editor; a program in a suitable form to be loaded into memory and executed. Load modules are stored in the load library.

Master File:

A file containing the actual air quality data as collected. The master file is used to generate reports, including sending the required quarterly report to SAROAD. File format and field descriptions can be found in Section 4.5.1.2.

Method Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Module:

A group of records treated as a unit. Often refers to an individual member of a partitioned data set or library. Each program in AQDHS-II is stored as a module in both the source and load libraries.

Month:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

NADB:

An acronym for the National Air Data Branch which is in the EPA's Office of Air Quality Planning and Standards.

Null Reading:

A reading for which no information is known. The position in the record for a null reading is filled with 9's; that is, the reading is 9999 with a decimal code of zero. In the sliding average program, readings of 9998 are generated as null readings and indicate that not enough readings were present to calculate a sliding average.

Object Module:

A module that is produced by a compiler and input to a linkage editor. Object modules are not saved in AQDHS-II since the compiler and linkage editor are executed within one procedure.

Observation:

Used in AQDHS-II to signify reading. See reading.

Option Card:

A card used to provide instructions to a program. Used interchangeably with control card. Options are used in AQDHS-II to indicate such things as whether files should be listed, whether warnings should be printed, or the number of lines to be printed on a page.

Parameter:

The word has two meanings in AQDHS-II. One refers to a pollutant or other variable being measured (see Parameter Code). The other definition is used to refer to certain variables in the cataloged procedures which may be changed when the procedure is run. These variables are called substitutable parameters.

Parameter Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Parameter File:

A file containing information on the parameters used by a given AQDHS-II installation. The file is used for validation and for printing information on reports. File format and field descriptions can be found in Section 4.2.2.2.

Parameter Standards File:

A file containing descriptions of standards for the parameters used in AQDHS-II. The file is used for printing information on reports. File format and field descriptions can be found in Section 4.4.2.2.

Partitioned Data Set:

A file containing several individual groups of records. This file can be used as a whole, or each group of records (module) may be used alone. In AQDHS-II, partitioned data sets are used as libraries to store the source programs, the load modules, and the procedures.

Percentile:

A term used in the statistical analysis package which denotes a value for which a specified pecentage of a group of data fall below or are equal to that value, e.g., the 30th percentile is a value for which 30% of the readings are less than or equal to that value.

Permanent File:

A file kept after execution of a job has been completed. Such a file may be used by later jobs and may be cataloged. Examples of permanent files in AQDHS-II include the master, parameter, site, and parameter standards files.

Procedure:

A series of JCL statements used to execute one or more programs. In AQDHS-II, the procedures are stored and cataloged in a procedure library. A program may be executed by naming the procedure without supplying all the required JCL needed for that program.

Program:

A series of statements in a language acceptable by a computer and used to achieve a specified result.

Project Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Reading:

A field in the master file containing the actual value measured for a given variable. Reading is referred to as DATA-FIELD in the retrieval. Each record contains from one to thirty-one readings, depending upon the time code of the record.

Repeating Section:

A portion of each master file record containing the readings and both the status codes and decimal codes for those readings. The repeating section is variable in length and may contain from one to thirty-one readings.

Run Stream:

A deck consisting of JCL cards and, possibly, option cards and transactions used to execute one or more successive procedures. Generally, a run stream will contain one job.

SAROAD:

Acronym for Storage And Retrieval Of Aerometric Data. Refers to a technique for coding air quality data and also a data base maintained by EPA containing air quality data from the entire United States.

Site Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Site File:

A file containing descriptive information for all sites used by an AQDHS-II installation. The site file is used for validation and for report information. The file format and field definitions can be found in Section 4.3.2.2.

SLAMS/NAMS ID:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description. Also a site file field (see Figure 4.3.2-a). Also referred to as SLAMS-ID.

Sliding Average Answer File:

A file created by the retrieval when using the SLIDING option. This file should only be used as input to the sliding average program, ASTSLAV (AQ0180).

Sliding Average Value File:

A file created by the sliding average program, ASTSLAV (AQ0180). It should only be used as input to the master file detailed report program ARPMSTR (AQ0230).

Software:

All programs which can be used on a particular computer system. Includes compilers, library routines, and user-written programs.

Source Program or Source Module:

A program written in a programming language that cannot be directly processed by the computer, but which must be compiled and link edited prior to being executed. The source programs in AQDHS-II are written in either COBOL or FORTRAN.

Space:

A variable used in JCL to indicate the amount of room ocupied by a file on a direct access device (disk). Space is allocated by either tracks or cylinders.

Standard Answer File:

A file created by the retrieval without the SLIDING option being used. Standard answer files may be used for any reports, but should not replace the master file for file maintenance purposes. Also see Answer File and Sliding Average Answer File.

Start Hour:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

State:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Status Flag:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Structured Programming:

A coding technique used AQDHS-II. See Section 2.2.

Substitutable Parameters:

Variables in the AQDHS-II procedures which may change from one run of a procedure to the next, and which may be changed by specifying keywords defined in the procedure along with the values to be used. A list of the substitutable parameters is given with the information on individual procedures in the user's guide.

Systems Personnel:

People involved with the user support and/or operations for a computer installation. Systems personnel can supply information, such as disk and tape drives used and required account codes, and can give assistance in correcting system problems.

Tape:

A magnetic film coated with a substance which allows data to be stored by selective magnetism. Tapes can be used to store files for AQDHS-II. The user should consult his systems personnel for information on the characteristics of the tape drives used at his installation.

Temporary File:

A file used during the duration of one job and then discarded. Temporary files are used to pass data from one program to another within the same job.

Time Code:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

Top-down:

A term used in structured programming. See Section 2.2.

Track:

A unit of measure for space allocation on a disk. The size of a track is dependent upon the type of disk used.

Transaction:

A card (or other record) used to enter data into the system. All transactions are edited by the AQDHS-II programs prior to being used.

Unit:

A term used in JCL to specify the device type used for storing a file. Values include DISK, TAPE, or specific types of disk or tape.

Update Message:

A portion of the diagnostic report printed at the beginning of the execution of each program in AQDHS-II. Information given includes the name, revision level, update status, and update date of the program. The information is useful for troubleshooting.

Volume:

A recording medium, such as a tape or disk, which is mounted and dismounted as a unit. A volume is identified by a volume serial number.

WARNING:

A type of error message used in AQDHS-II to inform the user of an aspect of the input data which may warrant his attention. A warning condition does not cause data to be rejected nor the execution of the program to be terminated. Warning messages may be suppressed.

Year:

An AQDHS-II master file field. See Figure 4.5.1-b for a complete description.

2.0 OVERVIEW OF AQDHS-II

2.1 INTRODUCTION

The National Air Data Branch (NADB) of the Environmental Protection Agency (EPA) has the responsibility of collecting, storing, retrieving, and analyzing air quality and emissions data for 50 states and 5 territories. In order to aid the data flow and to assist the states in the monitoring and control of atmospheric pollution, EPA has developed and provided the Comprehensive Data Handling System (CDHS).

The purpose of CDHS is to provide the user with a systematic approach to solving the problem of creating and maintaining files, submitting data to EPA, doing statistical analysis, and generating internal reports from a large data base of observed pollutant concentrations or emissions.

CDHS currently consists of two major subsystems: the Emissions Inventory Subsystem with Permits and Registrations (EIS/P&R) which processes emissions data, and the Air Quality Data Handling Subsystem (AQDHS-II) which processes ambient air quality and meteorological data. This User's Guide deals only with AQDHS-II and is intended to provide the user of AQDHS-II with a usable day-to-day reference document.

AQDHS-II currently consists of 35 computer programs (33 written in ANS-68 COBOL, 2 written in ANS FORTRAN) which provide the user with a variety of tools to assist him in the enormous task of organizing, storing, and analyzing the vast amounts of ambient air quality data collected by him.

A discussion of program structure is provided in Section 2.2 and a chart illustrating the interrelationships of the functional areas in AQDHS-II is provided in Section 2.3. More detailed flow diagrams of each functional area and its component programs are provided in the section discussing that particular function.

2.2 PROGRAM STRUCTURE

The AQDHS-II programs are modularized by function; i.e, each program performs one complete function. When several functions are needed for a given process (such as file maintenance), the separate programs that perform the component functions are performed in a single procedure. This modularization gives the system greater flexibility. An illustration of this modularity can be seen in the following example: ASRPARM (AQ0150) sorts parameter file transactions, AEMPARM (AQ0070) maintains the parameter file, and ARPPARM (AQ0240) prints the parameter file. The sort and file maintenance programs are performed by the procedure AQEMP10, and the report by AQRPP10. Both procedures should be run when the parameter file is updated, but the report procedure may be run alone whenever a listing of the parameter file is desired.

All of the programs in AQDHS-II are written using American National Standard (ANS) COBOL or FORTRAN. An attempt is made to standardize the programs so that they can be run on a variety of vendor main frames with minimal changes. Currently, the AQDHS-II system has been installed on IBM-370, UNIVAC 1100, CDC CYBER, Honeywell 6000, AMDAHL, and ITEL series computers.

Structured programming techniques have been used in writing the programs; i.e., the programs are designed using a 'top-down' technique with control remaining in a short mainline module. The program tasks are accomplished by self-contained modules performed from the mainline. As a result of this top-down design, the programs are self-documenting. These structured techniques are not in themselves of interest to the user, but they do allow for easier maintenance of the programs when modifications or troubleshooting support are needed.

Several programs contain COBOL sorts which have been developed so that the user does not have to code system sort procedures or provide control cards. The COBOL sort is an ANS structure and should work on most computers;

however, the actual collating sequence used is determined by the default value of the hardware. As an example, EBCDIC sequence (used on IBM) sorts alphabetic characters before numeric ones, while ASCII sequence (variations used by Honeywell, UNIVAC, and CDC) sorts numeric before alphabetic characters.

2.3 SYSTEM CHARTS

A system-level flowchart of AQDHS-II is shown in Figure 2.3-a. This flowchart depicts the relationships of the major processing functions of AQDHS-II. Included in the flowchart are references to sections of this document that contain detailed information on each processing function. More detailed flowcharts of each function are presented in the referenced sections.

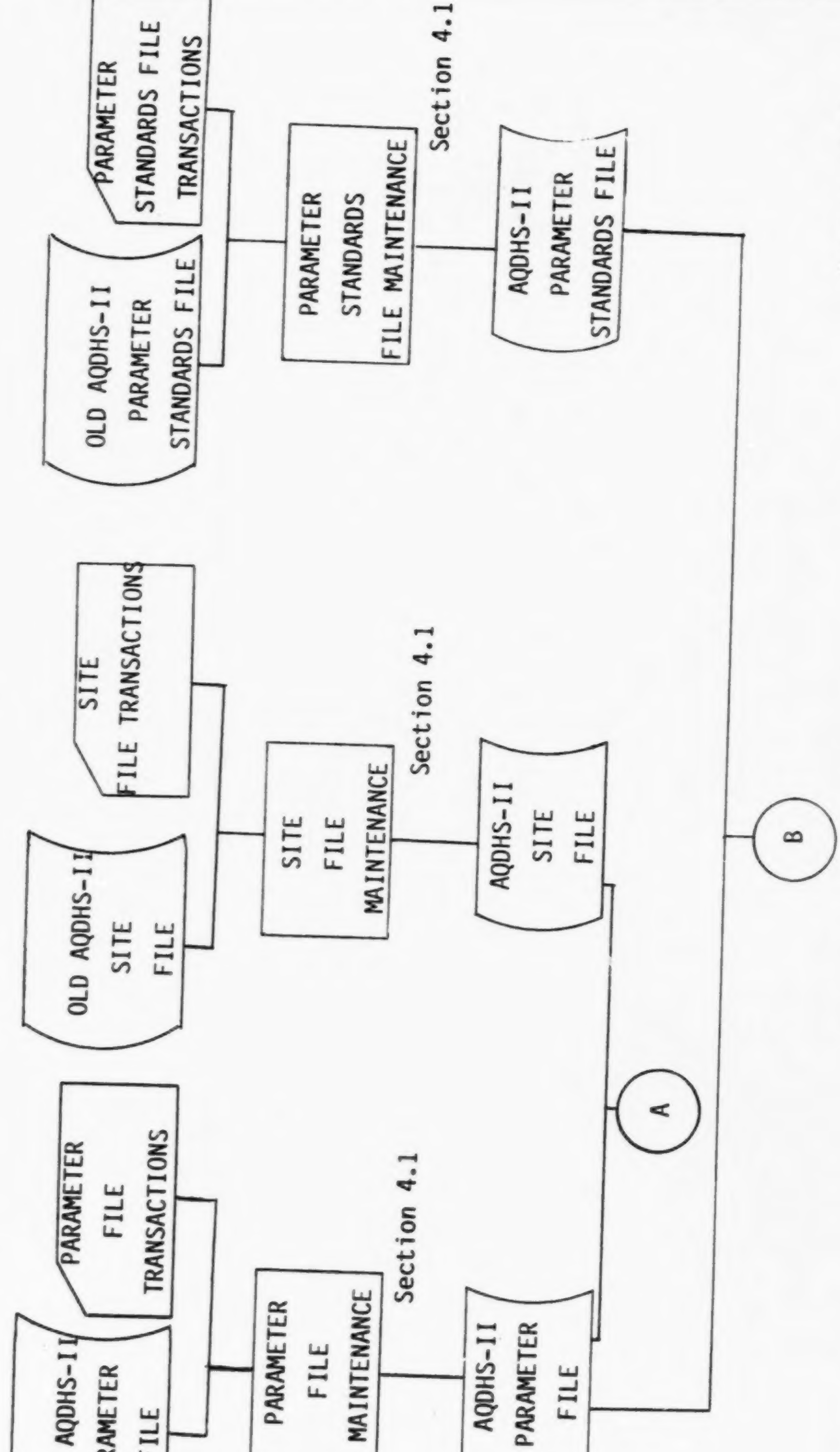
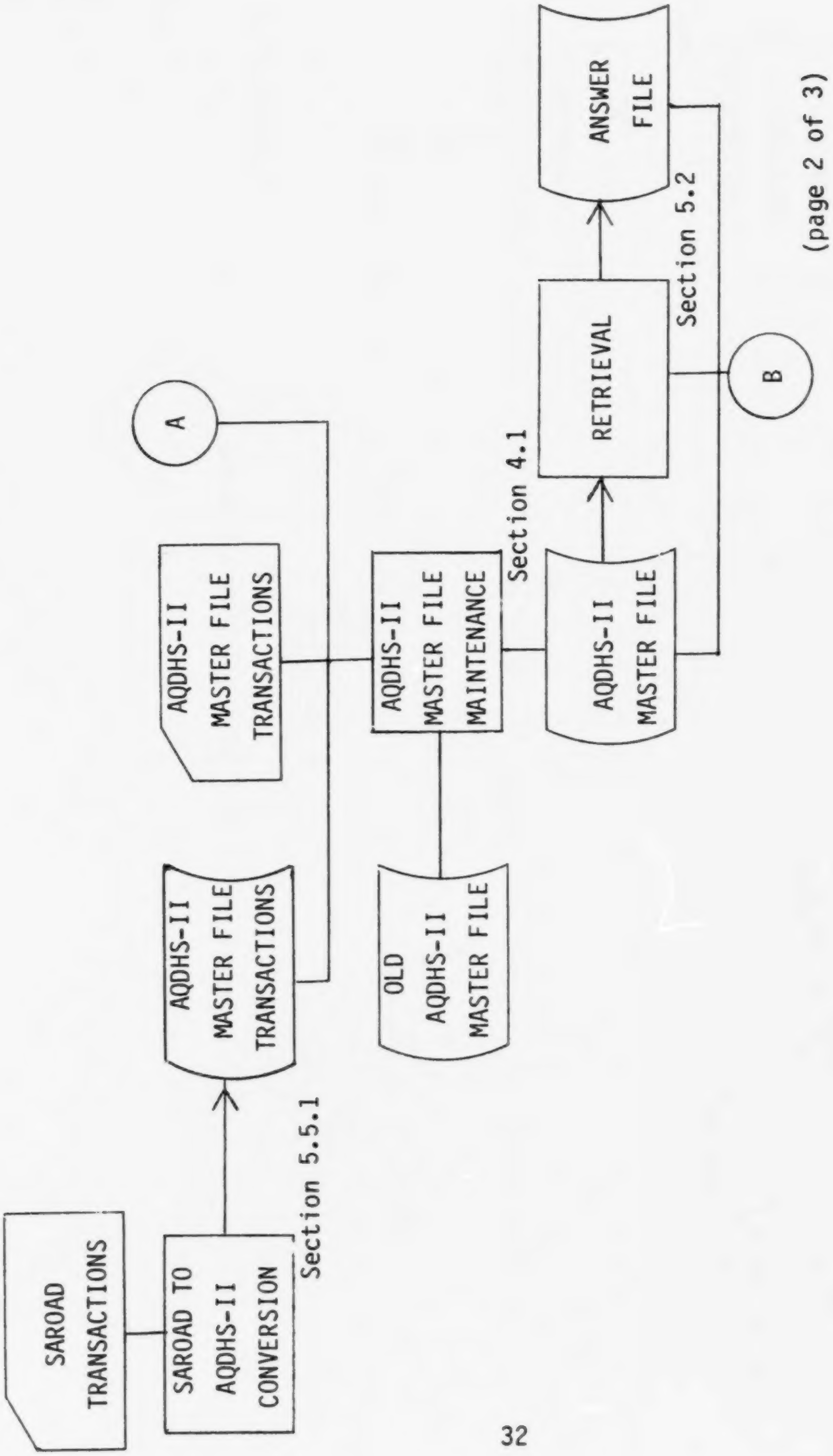

OLD AQDHS-II PARAMETER FILE
PARAMETER FILE TRANSACTIONS
PARAMETER FILE MAINTENANCE
Section 4.1
AQDHS-II PARAMETER FILE
A
OLD AQDHS-II SITE FILE
SITE FILE TRANSACTIONS
SITE FILE MAINTENANCE
Section 4.1
AQDHS-II SITE FILE
B
OLD AQDHS-II PARAMETER STANDARDS FILE
PARAMETER STANDARDS FILE TRANSACTIONS
PARAMETER STANDARDS FILE MAINTENANCE
Section 4.1
AQDHS-II PARAMETER STANDARDS FILE

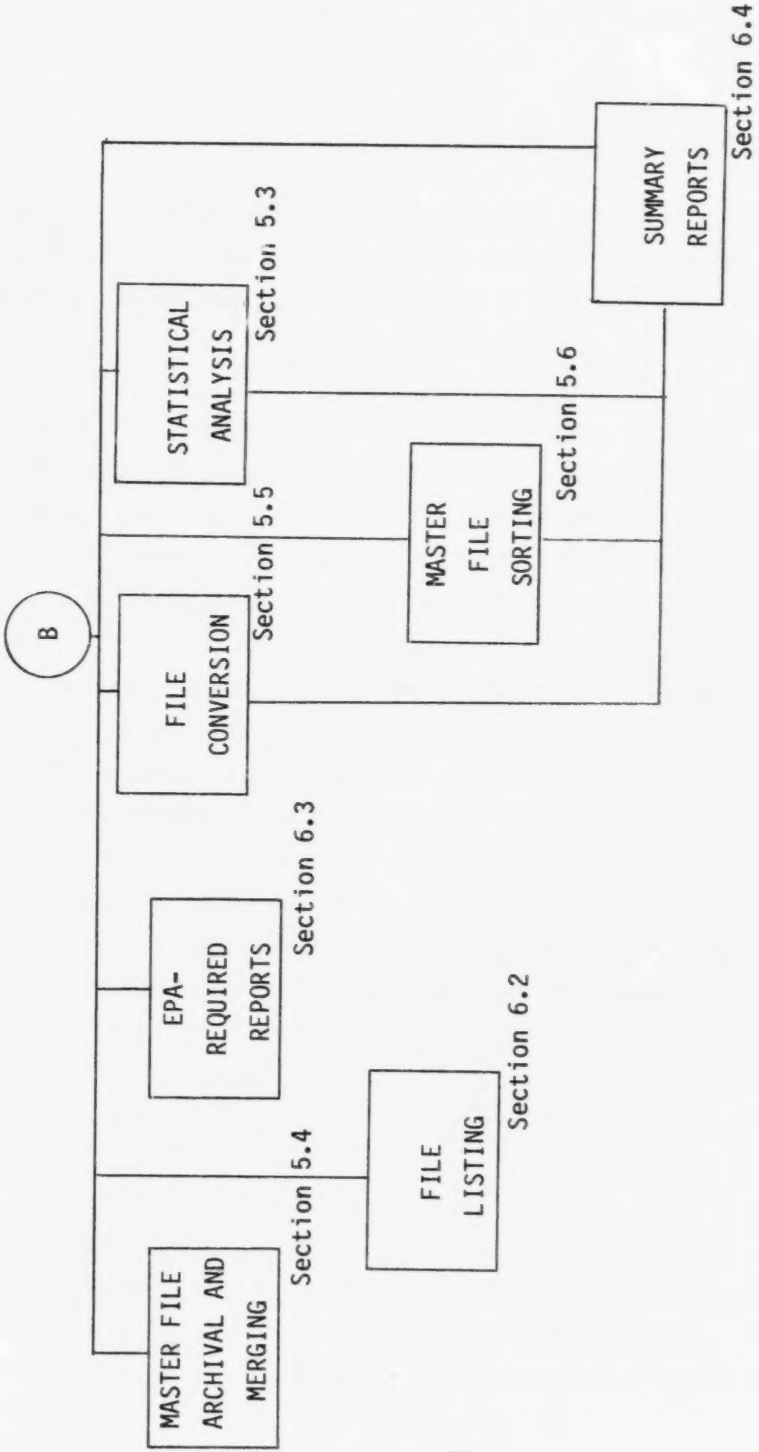
Figure 2.3-a. AQDHS-II System Flowchart

(page 1 of 3)


SAROAD TRANSACTIONS
SAROAD TO AQDHS-II CONVERSION
Section 5.5.1
AQDHS-II MASTER FILE TRANSACTIONS
AQDHS-II MASTER FILE TRANSACTIONS
OLD AQDHS-II MASTER FILE
AQDHS-II MASTER FILE MAINTENANCE
Section 4.1
AQDHS-II MASTER FILE
A
RETRIEVAL
Section 5.2
ANSWER FILE
B

(page 2 of 3)

Figure 2.3-a - Continued. AQDHS-II System Flowchart



(page 3 of 3)

Figure 2.3-a - Continued. AQDHS-II System Flowchart

3.0 ECONOMICS

3.1 ECONOMY MEASURES

Several steps can be taken to reduce the cost of the AQDHS-II system, such as keeping the size of the files as small as possible, printing files only when necessary, storing frequently used retrievals, and updating files only when a substantial number of transactions are available.

Since the cost of running any program is directly related to the size of the files processed by that program, the user's files should be as small as possible. The size can be reduced by archiving static data of the master file so that the current master file will contain only that data needed for file maintenance and current reports. See Section 5.4 for information on file archival. The size of the parameter, site, and parameter standards files can be controlled by assuring that they contain only information actually in use, i.e., that they precisely reflect the master file data. Not only are these auxiliary files read by programs (including the master file edit, AEDMSTR (AQ0060), and several report programs), but also the data from these files is stored in tables, which must be large enough to hold an entire file. Since the amount of core necessary to run a program increases with the size of these tables, they should be kept as small as possible. The size of the input master file which is processed by a report program can be reduced without actually reducing the size of the master file. This can be accomplished by running the retrieval package prior to generating the report so that only the desired data is printed. See Section 5.2 for information on retrievals.

Several programs have a LIST option. This option allows for complete files to be printed, usually confirmation listings of the input and output files. Since printing the files does add to the cost of running these programs, the LIST option should only be used when a listing is required; otherwise, the NOLIST option should be used. Some programs, especially those that edit transactions, also contain a FLAGW option which causes all warning messages to be printed. Using the NOFLAGW option (and thus suppressing the warning messages) will reduce the cost of operation.

Another cause of unnecessary cost is running the entire retrieval process using identical retrieval specifications to retrieve the same data from different files. If it is known that a retrieval will be executed multiple times, the load module created in the first execution should be stored. This allows the retrieval language processor to be bypassed and only the retrieval itself to be executed. The cataloged procedures AQRTM20 (see Section 5.2.2.5) and AQRTM30 (Section 5.2.3.5) are provided to facilitate the re-execution of retrievals.

Another form of unnecessarily repeated program execution is updating the master file each time transactions are edited. Since a large part of the cost of updating a file is the actual processing of the file (i.e., reading, searching, and writing), as many transactions as possible should be entered in one update run. This can be accomplished by editing the various batches of transactions as they are coded, saving the resulting internal transactions, and concatenating them for one execution of file maintenance. The cataloged procedures AQEDT10 (see Section 4.5.1.5) and AQFMM10 (see Section 4.5.3.5) provide the means of doing this.

Additional cost considerations are included in the discussions of the individual AQDHS-II programs. These considerations include the cost of a sample run of the program and, where applicable, information on how to reduce costs for running the program.

4.0 FILE CREATION AND MAINTENANCE

4.1 INTRODUCTION

The primary file in the AQDHS-II system is the master file which contains the user's ambient air quality data. At a gross level, the function of AQDHS-II is to place data in the master file and extract data from the master file (including the very important function of extracting data from the AQDHS-II master file for submission to SAROAD).

There are three auxiliary files to the master file: the parameter file, the site file, and the parameter standards file. The auxiliary files are used primarily in editing the master file transactions and in providing prose descriptions of parameters, sites, and parameter standards which appear in various reports. The parameter and site files must be created prior to the creation of the master file since they supply various edit criteria used in the verification of master file transactions.

The master file, parameter file, site file, and parameter standards file are sequential files (i.e., the file records are read sequentially from beginning to end). The master file contains variable-length records with the length of each record determined by the number of readings stored in that record; the three auxiliary files contain fixed-length records.

4.1.1 PARAMETER FILE CREATION AND MAINTENANCE

Two programs must be executed to create or update the parameter file: the parameter file transaction sort program, ASRPARM (AQ0150), and the parameter file maintenance program, AEMPARM (AQ0070). Refer to Figure 4.1.1-a for the parameter file maintenance flowchart.

ASRPARM (AQ0150) sorts the input parameter file transactions and passes the sorted transactions to AEMPARM (AQ0070), which edits the sorted transactions and uses those transactions that pass the edit criteria to create or update the parameter file. When a parameter file is being created initially, no old parameter file is input to AEMPARM (AQ0070); however, when updating an existing parameter file, that file is input to AEMPARM (AQ0070). AEMPARM (AQ0070) produces the new parameter file and, optionally, listings of the input transactions, the old parameter file, and the new parameter file. Both ASRPARM (AQ0150) and AEMPARM (AQ0070) produce a diagnostic report.

Refer to Sections 4.2.1 and 4.2.2 for detailed discussions of ASRPARM (AQ0150) and AEMPARM (AQ0070), respectively.

ASRPARM (AQ0150) and AEMPARM (AQ0070) may be executed using the cataloged procedure AQEMP10, which is discussed in Section 4.2.2.5. Examples of job streams to create and update a parameter file are shown in Section 4.2.2.5.4.

4.1.2 SITE FILE CREATION AND MAINTENANCE

Two programs are executed to create or update the site file: the site file transaction sort program, ASRSITE (AQ0160); and the site file maintenance program, AEMSITE (AQ0080). See Figure 4.1.2-a for the site file maintenance flowchart.

ASRSITE (AQ0160) sorts the input site file transactions and passes the sorted transactions to AEMSITE (AQ0080). AEMSITE (AQ0080) edits the sorted transactions and uses those transactions that pass the edit criteria to create or update the site file. When a site file is being created initially, no old site file is input to AEMSITE (AQ0080); however, when updating an existing site file, that file is input to AEMSITE (AQ0080). Both ASRSITE (AQ0160) and AEMSITE (AQ0080) produce a diagnostic report.

Refer to Sections 4.3.1 and 4.3.2 for detailed discussions of ASRSITE (AQ0160) and AEMSITE (AQ0080), respectively.

ASRSITE (AQ0160) and AEMSITE (AQ0080) may be executed using the cataloged procedure AQEMS10, which is discussed in Section 4.3.2.5. Examples of job streams to create and update a site file are shown in Section 4.3.2.5.4.

4.1.3 PARAMETER STANDARDS FILE CREATION AND MAINTENANCE

Two programs are executed to create or update the parameter standards file: the parameter standards file transaction sort program, ASRSTND (AQ0170), and the parameter standards file maintenance program AEMSTND (AQ0090). See Figure 4.1.3-a for the parameter standards file maintenance flowchart.

ASRSTND (AQ0170) sorts the input parameter standards file transactions and passes the sorted transactions to AEMSTND (AQ0090). AEMSTND (AQ0090) edits the sorted transactions and uses those transactions that pass the edit criteria to create or update the parameter standards file. When a parameter standards file is being created initially, no old parameter standards file is input to AEMSTND (AQ0090); however, when updating an existing parameter standards file, that file is input to AEMSTND (AQ0090). Both ASRSTND (AQ0170) and AEMSTND (AQ0090) produce a diagnostic report.

Refer to Sections 4.4.1 and 4.4.2 for a detailed discussion of ASRSTND (AQ0170) and AEMSTND (AQ0090), respectively.

ASRSTND (AQ0170) and AEMSTND (AQ0090) may be executed using the cataloged procedure AQEMD10, which is discussed in Section 4.4.2.5. Examples of job streams to create and update a parameter standards file are shown in Section 4.4.2.5.4.

4.1.4 MASTER FILE CREATION AND MAINTENANCE

The following programs are executed to create or update the master file: the master file transaction edit program, AEDMSTR (AQ0060); the master file transaction sort program, ASRINTR (AQ0130); the master file maintenance program, AFMMSTR (AQ0100); and, possibly, the SAROAD to AQDHS-II conversion program, ACVSARD (AQ0010). See Figure 4.1.4-a for the master file maintenance flowchart.

The user may code transactions to enter in the AQDHS-II master file in either AQDHS-II format or SAROAD format. If the transactions are coded in AQDHS-II format, they are input directly to AEDMSTR (AQ0060) for editing. If they are coded in SAROAD format, they must be converted to AQDHS-II format by ACVSARD (AQ0010) prior to being edited by AEDMSTR (AQ0060).

AEDMSTR (AQ0060) edits AQDHS-II format master file transactions; the parameter and site files are used to verify the parameter and site fields in the master file transactions. AEDMSTR (AQ0060) converts those transactions which pass the edit criteria to internal format and passes the internal transactions to ASRINTR (AQ0130). Optionally, AEDMSTR (AQ0060) produces a listing of those transactions which pass the edit criteria.

ASRINTR (AQ0130) sorts the internal transactions and passes the sorted internal transactions to AFMMSTR (AQ0110).

AFMMSTR (AQ0110) processes the sorted internal transactions and uses them to create or update the master file. When a master file is being created initially, old master file is input to AFMMSTR (AQ0110); however, when updating an existing master file, that file is input to AFMMSTR (AQ0110). AFMMSTR (AQ0110) produces the new master file and, optionally, listings of the input internal transactions and those records in the old and new master files which were affected by AFMMSTR (AQ0110).

ACVSARD (AQ0010), AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0110) each produce a diagnostic report.

There are two methods which may be used in maintaining the master file. The user may choose to execute AEDMSTR (AQ0060) repetitively, each time editing a different set of master file transactions and later merge (or concatenate) the internal transactions before processing them through ASRINTR (AQ0130) and AFMMSTR (AQ0110). Or, the user could choose to execute all file maintenance programs for each set of master file transactions.

Refer to the following sections for a detailed discussion of each of the master file maintenance programs: ACVSARD (AQ0010), 5.5.2; AEDMSTR (AQ0060), 4.5.1; ASRINTR (AQ0130), 4.5.2; AFMMSTR (AQ0100), 4.5.3.

ACVSARD (AQ0010) may be executed using the cataloged procedure AQCVT10, which is discussed in Section 5.5.2.5. A sample run stream to convert SAROAD format transactions to AQDHS-II transactions is shown in Section 5.5.2.5.4.

AEDMSTR (AQ0060) may be executed using the cataloged procedure AQEDT10, which is discussed in Section 4.5.1.5. ASRINTR (AQ0130) and AFMMSTR (AQ0100) may be executed using the cataloged procedure AQFMM10, which is discussed in Section 4.5.3.5. AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100) may all be executed using the cataloged procedure AQEMM10, which is discussed in Section 4.6.1. An example of a job stream to create a master file using procedure AQEMM10 is shown in Section 4.6.1.1.4. Sample job streams to update an existing master file using procedures AQEDT10 and AQFMM10 are shown in Sections 4.5.1.5.4 and 4.5.3.5.4.

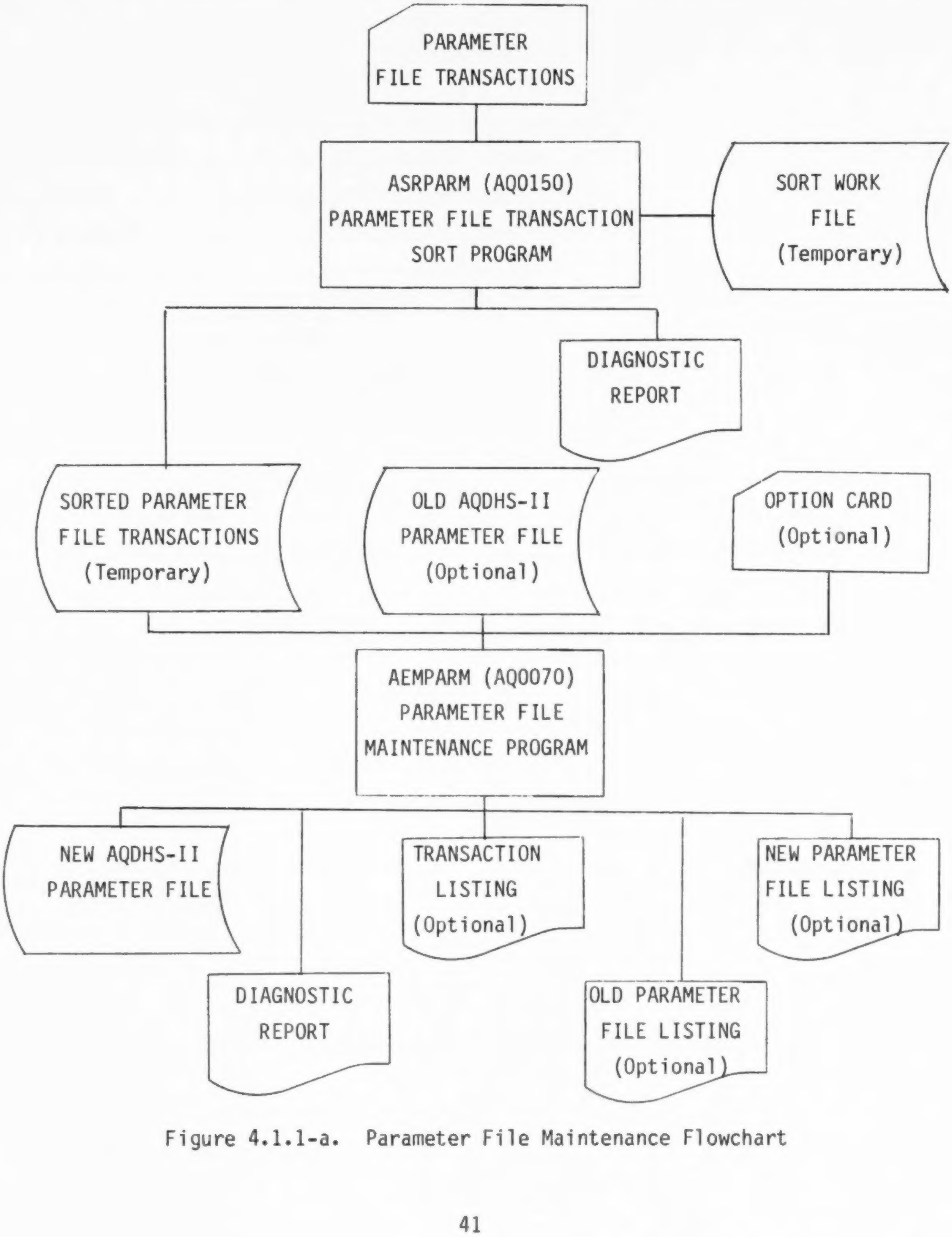

PARAMETER FILE TRANSACTIONS
ASRPARM (AQ0150) PARAMETER FILE TRANSACTION SORT PROGRAM
SORT WORK FILE (Temporary)
DIAGNOSTIC REPORT
SORTED PARAMETER FILE TRANSACTIONS (Temporary)
OLD AQDHS-II PARAMETER FILE (Optional)
OPTION CARD (Optional)
AEMPARM (AQ0070) PARAMETER FILE MAINTENANCE PROGRAM
NEW AQDHS-II PARAMETER FILE
TRANSACTION LISTING (Optional)
NEW PARAMETER FILE LISTING (Optional)
DIAGNOSTIC REPORT
OLD PARAMETER FILE LISTING (Optional)

Figure 4.1.1-a. Parameter File Maintenance Flowchart

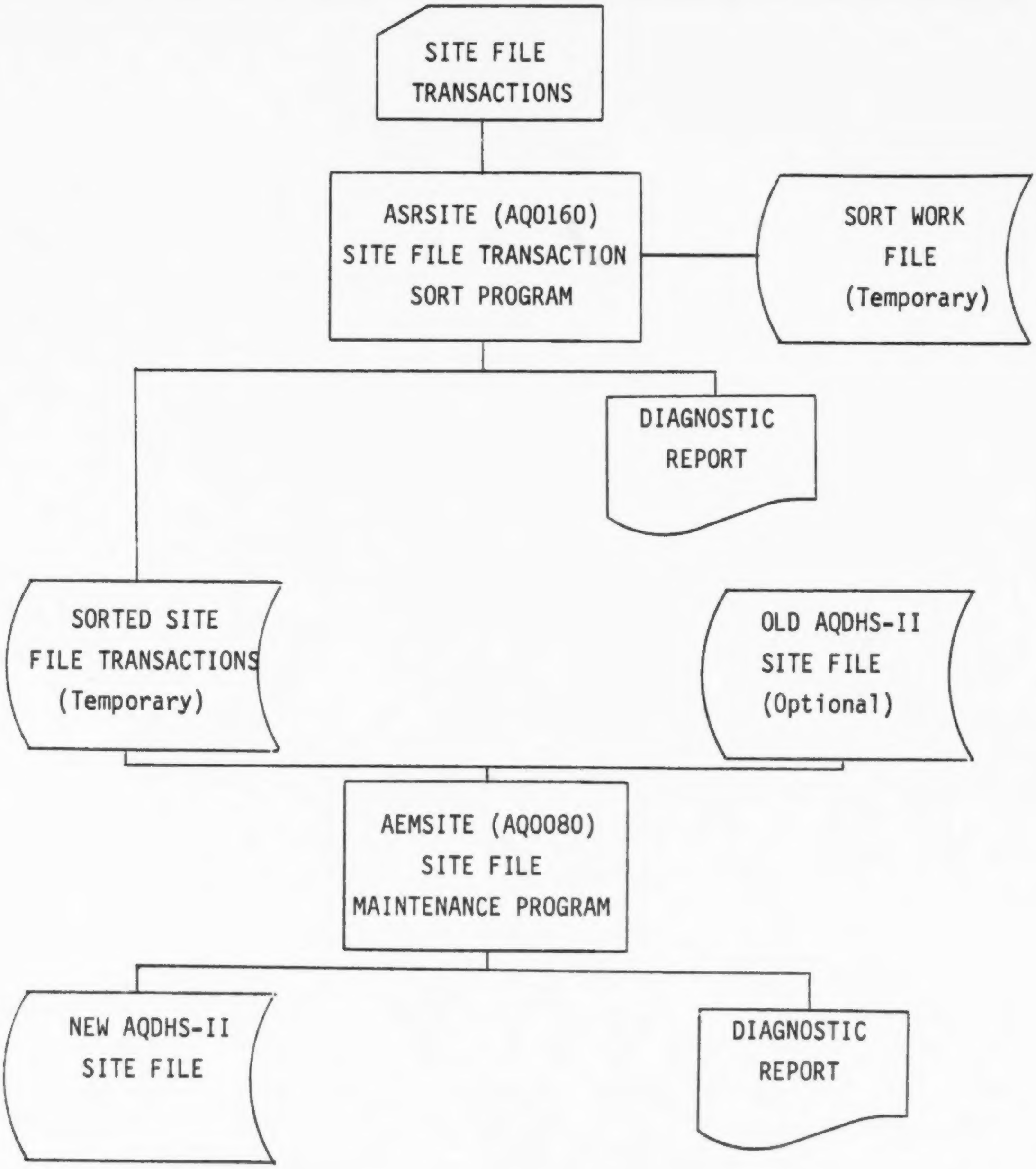
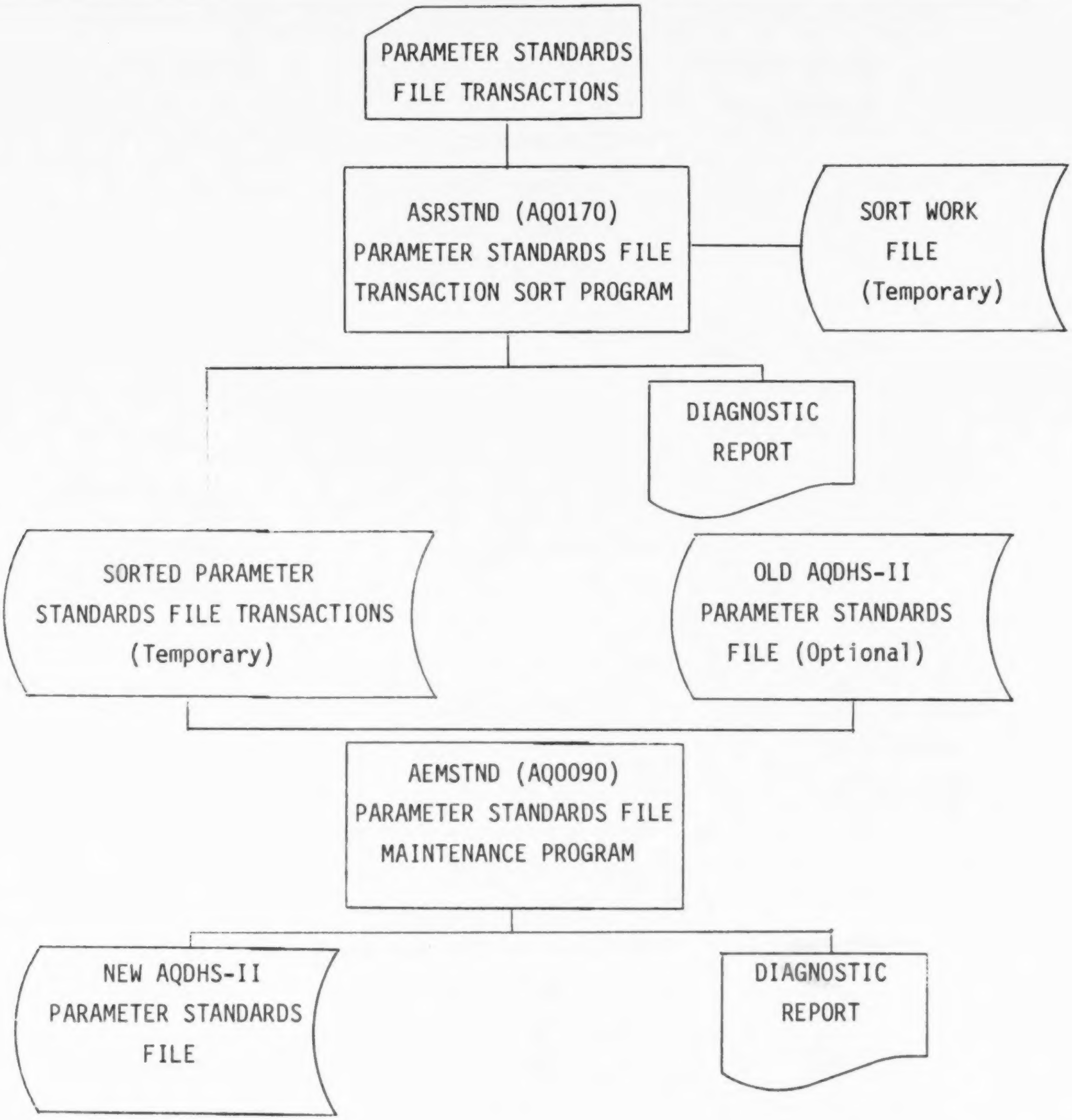
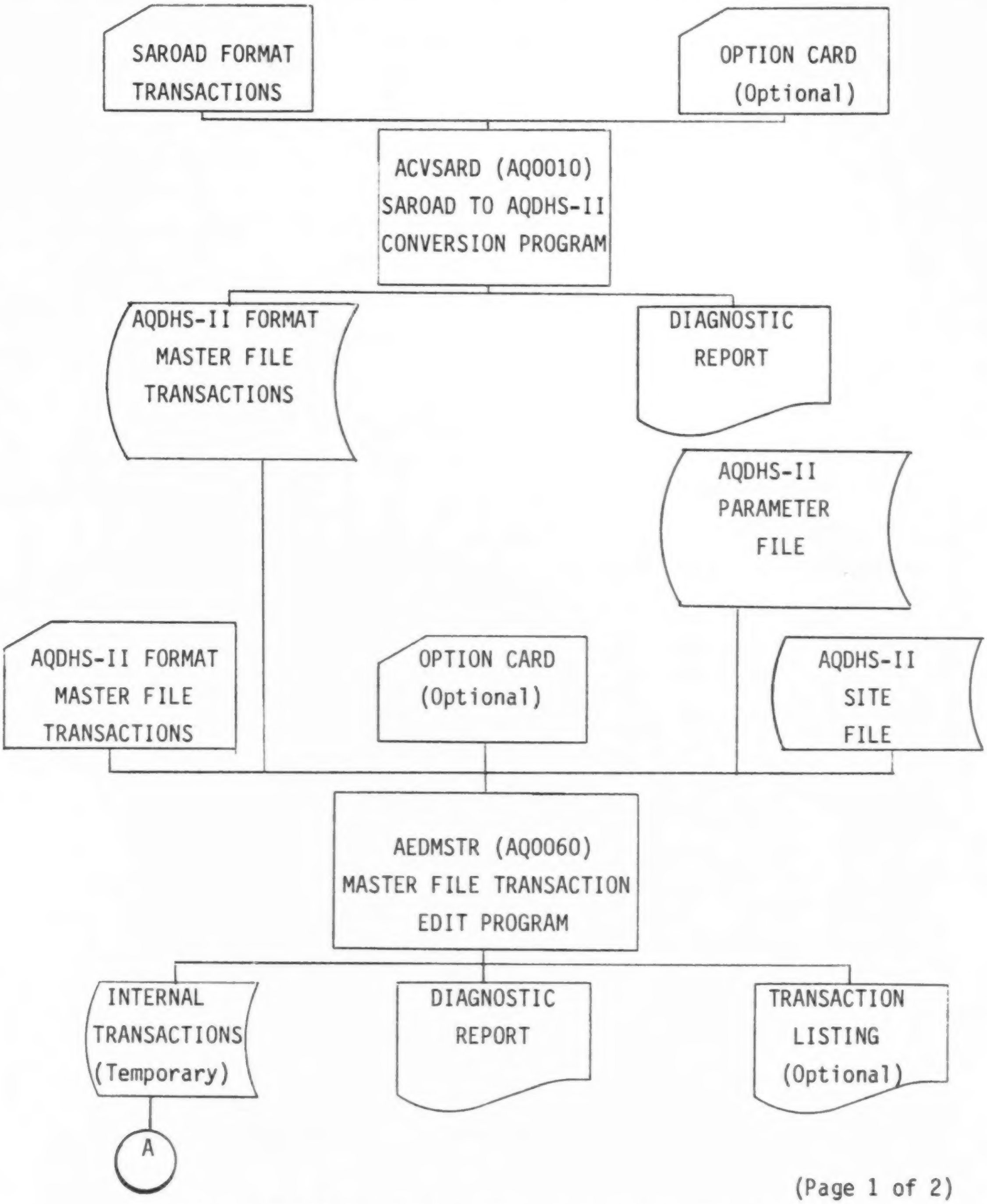


Figure 4.1.2-a. Site File Maintenance Flowchart



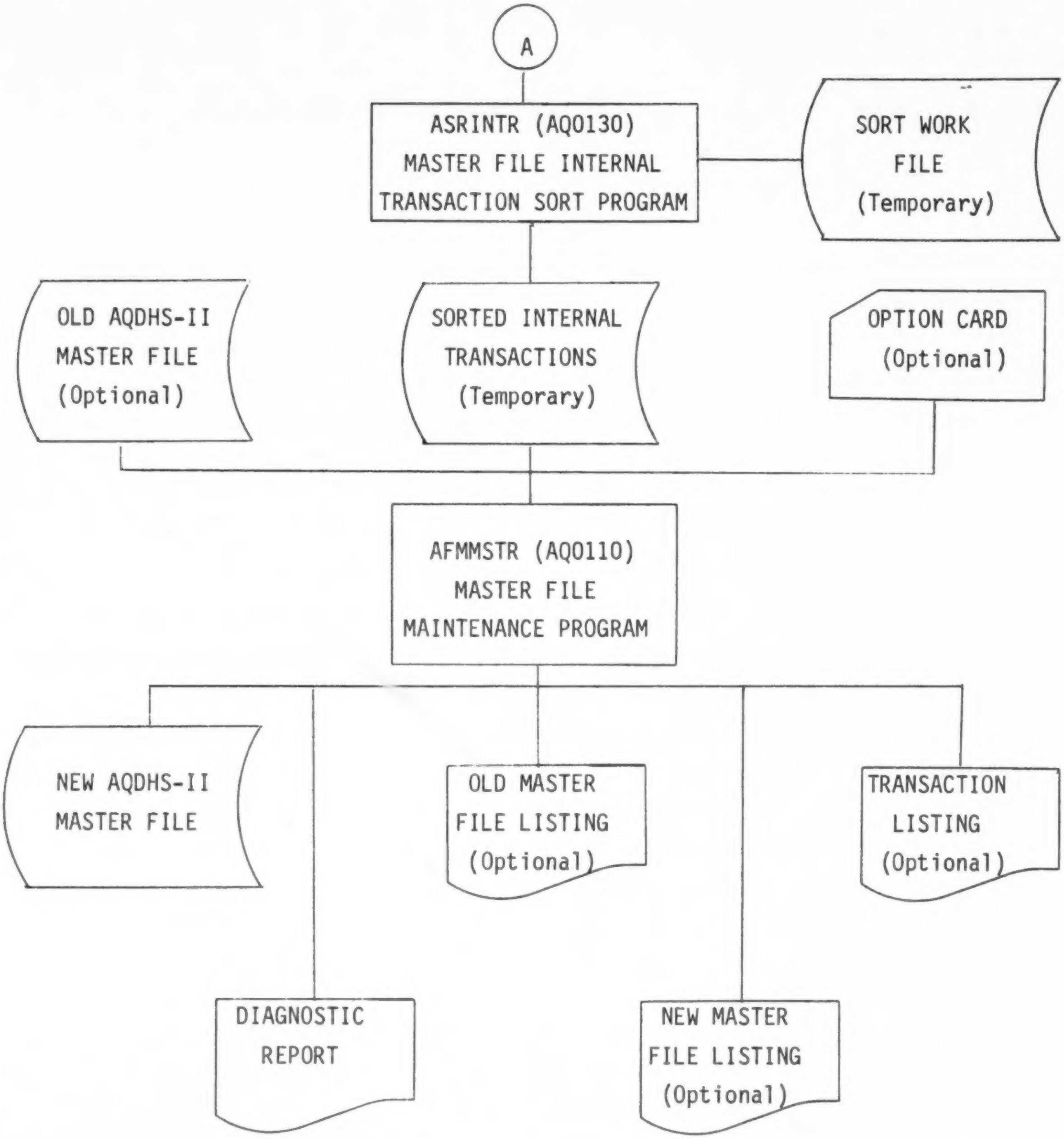
PARAMETER STANDARDS FILE TRANSACTIONS
ASRSTND (AQ0170) PARAMETER STANDARDS FILE TRANSACTION SORT PROGRAM
SORT WORK FILE (Temporary)
DIAGNOSTIC REPORT
SORTED PARAMETER STANDARDS FILE TRANSACTIONS (Temporary)
OLD AQDHS-II PARAMETER STANDARDS FILE (Optional)
AEMSTND (AQ0090) PARAMETER STANDARDS FILE MAINTENANCE PROGRAM
NEW AQDHS-II PARAMETER STANDARDS FILE
DIAGNOSTIC REPORT

Figure 4.1.3-a. Parameter Standards File Maintenance Flowchart


SAROAD FORMAT TRANSACTIONS
OPTION CARD (Optional)
ACVSARD (AQ0010) SAROAD TO AQDHS-II CONVERSION PROGRAM
AQDHS-II FORMAT MASTER FILE TRANSACTIONS
DIAGNOSTIC REPORT
AQDHS-II PARAMETER FILE
AQDHS-II FORMAT MASTER FILE TRANSACTIONS
OPTION CARD (Optional)
AQDHS-II SITE FILE
AEDMSTR (AQ0060) MASTER FILE TRANSACTION EDIT PROGRAM
INTERNAL TRANSACTIONS (Temporary)
DIAGNOSTIC REPORT
TRANSACTION LISTING (Optional)
A

(Page 1 of 2)

Figure 4.1.4-a. Master File Maintenance Flowchart



(Page 2 of 2)

Figure 4.1.4-a. Master File Maintenance Flowchart

4.2 PARAMETER FILE

4.2.1 PARAMETER FILE TRANSACTION SORT PROGRAM - ASRPARM (AQ0150)

4.2.1.1 Description

ASRPARM (AQ0150) sorts parameter file transactions into the sequence required by the parameter file maintenance program AEMPARM (AQ0070); Figure 4.2.1-a details this sort order. All parameter file transactions must be sorted by ASRPARM (AQ0150) before they can be used to update (or create) the parameter file. See Section 4.2.2 for additional information on the parameter file transactions.

4.2.1.2 File Formats

Input to ASRPARM (AQ0150) consists solely of the parameter file transactions. See Section 4.2.2.2 for the parameter file transaction format.

ASRPARM (AQ0150) produces two output files: a file containing the sorted parameter file transactions and a diagnostic report. The transactions are in the same sequence as the parameter file and can be used as input to the parameter file maintenance program AEMPARM (AQ0070). An example of the diagnostic report is shown in Figure 4.2.1-b.

4.2.1.3 Options

There are no options.

4.2.1.4 Error Messages

There are no error messages.

4.2.1.5 Cataloged JCL

ASRPARM (AQ0150) should always be executed in conjunction with the parameter file maintenance program AEMPARM (AQ0070). See Section 4.2.2.5 for a discussion of the cataloged procedure AQEMP10, which executes both programs.

4.2.1.6 Warnings and Special Instructions

Note that the COBOL sort verb is used in this program; therefore, the collating sequence for alphanumeric fields is determined by the user's particular installation. Also note that there is a special sort sequence for action code (see figure 4.2.1-a).

In addition to the diagnostic report produced by ASRPARM (AQ0150), messages generated by the sort-merge package will be printed. The format and content, as well as the physical location, of these messages depends upon the computer or the user's particular installation.

4.2.1.7 Cost Considerations

The following estimates are for the execution of ASRPARM (AQ0150) on an IBM 370/168:

Number of parameter file transactions:	300 transactions
CPU time:	.7 seconds
I/O time:	12.9 seconds
Total time:	13.6 seconds
Estimated cost:	$2.36

4.2.1.8 Related Programs and Procedures

ASRPARM (AQ0150) should always be executed in conjunction with the parameter file maintenance program AEMPARM (AQ0070). The cataloged procedure AQEMP10 executes both programs.

Record Position	Description	Sort Sequence
2 - 6	Parameter Code	Ascending
7 - 8	Method Code	Ascending
9 - 10	Unit Code	Ascending
80	Action Code	*
1	Card Type	Ascending

Figure 4.2.1-a. Sort Sequence for Parameter File Transactions

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* Sort sequence is D (delete), A (add), C (change).

```
                    AQDHS-II PARAMETER FILE TRANSACTION SORT PROGRAM  -  DIAGNOSTIC REPORT                     PAGE  1
PROGRAM NAME: ASRPARM (AQ0150)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978


NUMBER OF INPUT TRANSACTIONS:         267
NUMBER OF OUTPUT TRANSACTIONS:        267
```

Figure 4.2.1-b. Diagnostic Report

4.2.2 PARAMETER FILE MAINTENANCE PROGRAM - AEMPARM (AQ0070)

4.2.2.1 Description

AEMPARM (AQ0070) creates and maintains the parameter file from user-supplied transactions. There are three transaction card types: card 1, card 2, and card 3. A complete set of the three card types is required to create a parameter file record. Each card in a set contains the same key information (parameter, method, and units codes. See Section 4.2.2.2 for additional information on these card types. The transactions must be sorted by the parameter file transaction sort program ASRPARM (AQ0150) into correct parameter file sequence before they can be used by AEMPARM (AQ0070) to create or update the parameter file. The sorted transactions are edited by AEMPARM (AQ0070) for invalid entries before any change is made to the parameter file. New parameter file records can be added and existing records changed or deleted; a parameter file is created from add transactions.

Addition of a record to the parameter file requires a complete set of the three transaction card types, each with an action code of A. Every defined field in these three cards, with two exceptions, must contain valid, non-blank data. The exceptions are the user units code and the user units conversion factor, which may be left blank if the user does not need them for the given parameter.

Any non-key field in an existing parameter file record can be changed. Changes are made by transactions containing the key of the record to be changed; new, valid data in the fields to be changed; and an action code of C. For changes to non-key fields, only those card types that contain the fields to be changed are needed. Non-key fields that are left blank on change transactions are not changed in the parameter file.

To change a field in the parameter key, a delete transaction should be created for the old key together with a complete set of add transactions containing the identical record information, but with the new key substituted for the old. When these transactions are submitted together, the result will be a change in key for the specified parameter record.

Deletion of a record is accomplished by coding a card type 1 transaction with only the following information: the appropriate key, the card type, and an action code of D.

Multiple actions may be performed on the same parameter key. For example, a record may be deleted, re-added, and then changed, all in the same update run.

4.2.2.2 File Formats

AEMPARM (AQ0070) uses three input files: the transaction file, the old parameter file (this file is optional), and an option card. The transaction file must be sorted by ASRPARM (AQ0150) (see Section 4.2.1) prior to its use as input to the parameter file maintenance program. The format of each transaction card type is shown in Figure 4.2.2-a; each transaction field is described in Figure 4.2.2-b. The old parameter file, to which the transactions will be applied, is also required input, unless the user is creating the initial parameter file. The parameter file format is shown in Figure 4.2.2-c. The option card controls the listing of input and output files and the printing of warning messages.

The primary output file is the new parameter file, which has the same format as the old parameter file. Four print files are also produced. One of these, the diagnostic report, is always printed. It includes all diagnostic messages generated by the transaction edit as well as the summary statistics for the update run. The other three print files list the input transaction file, the input parameter file, and the output parameter file. These latter three files appear in the printout only if the LIST option is specified on the option card (see Section 4.2.2.3). See Figure 4.2.2-d for a sample diagnostic report from this program.

4.2.2.3 Options

The option card for AEMPARM (AQ0070) contains two fixed-position option fields (see Figure 4.2.2-e for the option card format). The first option field on the card determines whether warning messages are to appear in the diagnostic report. If the user-supplied value in this field is FLAGW, warning messages will be listed along with all other messages. If the value is NOFLAGW or is any other value except FLAGW, warning messages will not be listed, although all other messages will be printed.

The second option field controls the listing of the input transactions, the input parameter file, and the output parameter file. If this field contains the value LIST, each of the three files will be listed in its entirety. If the value is NOLIST or any other value except LIST, none of these files will be listed.

Should there be no option card in the run stream, the default options NOFLAGW and NOLIST will be used.

4.2.2.4 Error Messages

AEMPARM 001 CONDITIONAL - NO OPTION CARD, DEFAULTS OF NOLIST, NOFLAGW USED

Meaning: There was no option card in the run stream.

Action: None, if the user intends for the default options to be used; otherwise, an option card should be included in the run stream and the job resubmitted.

AEMPARM 002 CONDITIONAL - INVALID FLAGW OPTION, DEFAULT OF NOFLAGW USED

Meaning: The value in the FLAGW field on the option card is neither

FLAGW nor NOFLAGW.

Action: If the user wishes warning messages to be listed, he must insert the value FLAGW in the FLAGW field and resubmit the job.

AEMPARM 003 CONDITIONAL - INVALID LIST OPTION, DEFAULT OF NOLIST USED

Meaning: The value in the list field on the option card is neither LIST nor NOLIST.

Action: If the user wishes the input and output files to be listed, he must insert the value LIST in the list field and resubmit the job.

AEMPARM 004 ERROR - INVALID CARD TYPE; 1,2,3 ALLOWED; CARD REJECTED

Meaning: The card type field contains a value other than 1, 2, or 3.

Action: Correct the card type field and resubmit the transaction.

AEMPARM 005 ERROR - INVALID PARAMETER CODE, CARD REJECTED

Meaning: The parameter code is either non-numeric or equal to zero.

Action: Correct the parameter code field and resubmit the transaction.

AEMPARM 006 ERROR - INVALID METHOD CODE, CARD REJECTED

Meaning: The method code is either non-numeric or equal to zero.

Action: Correct the method code field and resubmit the transaction.

AEMPARM 007 ERROR - INVALID UNITS CODE, CARD REJECTED

Meaning: The units code is either non-numeric or equal to zero.

Action: Correct the units code field and resubmit the transaction.

AEMPARM 008 ERROR - INVALID ACTION CODE, CARD REJECTED

Meaning: The only valid action codes are A (add), C (change), and D (delete).

Action: Correct the action code field and resubmit the transaction.

AEMPARM 009 ERROR - INVALID MINIMUM DETECTABLE DECIMAL CODE, CARD REJECTED

Meaning: The only valid decimal codes are 0, 1, 2, 3, and 4.

Action: Correct the decimal position field and resubmit the transaction.

AEMPARM 010 ERROR - INVALID MINIMUM DETECTABLE, CARD REJECTED

Meaning: The minimum detectable value must be of the form 'dddd' for non-negative values or '-ddd' for negative values.

Action: Correct the minimum detectable field and resubmit the transaction.

AEMPARM 011 ERROR - NEG MIN DETECTABLE INVALID FOR THIS PARAMETER, CARD REJECTED

Meaning: The only parameters that allow negative minimum detectable values are: lapse rate (61202), temperature (62101); dew point (62103); temperature, 24-hour maximum (62104); temperature, 24-hour minimum (62105); temperature difference (62106).

Action: Correct the minimum detectable field and resubmit the transaction.

AEMPARM 012 ERROR - STANDARD UNITS MUST BE SPECIFIED, CARD REJECTED

Meaning: On an add transaction, both standard units fields should have non-blank values.

Action: Insert the proper values in the standard units code and standard units conversion factor fields. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently acceptable standard units codes and standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 013 ERROR - INVALID STANDARD UNITS CODE, CARD REJECTED

Meaning: The standard units code field contains a non-numeric or zero value.

Action: Insert the proper value in the standard units code field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently acceptable standard units codes. Resubmit the corrected transaction.

AEMPARM 014 ERROR - INVALID STANDARD UNITS CONVERSION FACTOR, CARD REJECTED

Meaning: The standard units conversion factor field contains a non-numeric value.

Action: Insert the proper value in the standard units conversion factor field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 015 ERROR - STANDARD UNITS CONVERSION FACTOR MUST BE NON-ZERO, CARD REJECTED

Meaning: The standard units conversion factor field contains a zero value.

Action: Insert the proper value in the standard units conversion factor field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 016 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CODE, ASSUMING UNITS CODE IN KEY

Meaning: The user units fields in the add transaction were left blank; the program inserted into the user units code field the same value as the one in the units code field of the parameter key.

Action: None, if the user does not wish to specify additional units information in the user fields.

AEMPARM 017 ERROR - INVALID USER UNITS CODE, CARD REJECTED

Meaning: The user units code field contains a value that is non-numeric or zero.

Action: Correct the user units code field and resubmit the transaction.

AEMPARM 018 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CONV FAC, ASSUMING UNITY

Meaning: The user fields in the add transaction were left blank; the program inserted into the user units conversion factor field a value of 1.0 (see error message #16, above).

Action: None, if the user does not wish to specify additional units information in the user fields.

AEMPARM 019 ERROR - INVALID USER UNITS CONVERSION FACTOR, CARD REJECTED

Meaning: The user units conversion factor field contains a non-numeric value.

Action: Correct the user units conversion factor field and resubmit the transaction.

AEMPARM 020 ERROR - USER UNITS CONVERSION FACTOR MUST BE NON-ZERO, CARD REJECTED

Meaning: The user units conversion factor field contains a value of zero.

Action: Correct the user units conversion factor field and resubmit the transaction.

AEMPARM 021 ERROR - TRANSACTION IS DELETE AND NOT TYPE 1, CARD REJECTED

Meaning: A record is deleted only if a card type 1 delete transaction with the same parameter key is entered. No other card-type transaction will delete a record.

Action: If deletion of a record is intended, and there is no type 1 delete transaction for that parameter key in the input transactions, change the card type of this deletion to 1 and resubmit the transaction.

AEMPARM 022 ERROR - COLUMNS 11 THRU 79 OF DELETE CARD MUST BE BLANK, CARD REJECTED

Meaning: A delete transaction should have only the following fields coded: the card type field (value is 1), the parameter key fields, and the action code field (value is D).

Action: Correct the delete transaction and resubmit.

AEMPARM 023 ERROR - NO MATCH FOR TRANSACTION ON PARAMETER FILE, CARD REJECTED

Meaning: The transaction is a change or a delete transaction, but no matching parameter key can be found in the parameter file.

Action: Correct the parameter key of the transaction if a change or a delete is intended; otherwise, change the action code to A. Resubmit the transaction.

AEMPARM 024 ERROR - ADD TRANSACTION NOT ALLOWED FOR RECORD ON FILE, CARD REJECTED

Meaning: The transaction is an add transaction, but a record with the same key already exists in the file.

Action: Correct the parameter key if an add is intended; otherwise, convert the transaction to a change or delete transaction. Resubmit the transaction.

AEMPARM 025 ERROR - ADD TRANSACTION DOES NOT HAVE VALID 1, 2 AND 3 CARDS, CARD REJECTED

Meaning: A record cannot be added unless a full set of three valid transactions is present for it. Any otherwise valid add transactions in this incomplete set must be rejected since no parameter record can be created from them.

Action: Correct the given set of transactions to obtain three valid cards; resubmit these.

AEMPARM 026 ERROR - BLANK CARD, REJECTED

Meaning: A blank card was inserted in the transaction file.

Action: If the same transaction file is to be used again, remove the blank card.

AEMPARM 027 CONDITIONAL - NUMBER OF RECORDS IN OUTPUT PARAMETER FILE EXCEEDS 200

Meaning: Each AQDHS-II program (as released by NADB) that has a parameter-record storage table allows a maximum of 200 parameter records to be stored; a parameter file containing more than 200 records causes these programs to abort. AEMPARM (AQ0070) itself has no output file limit; it will generate as many output records as required by the interaction of the input parameter file and the input transactions.

Action: Either delete enough parameter records to make the file fall within the limit of 200 records, or increase the limit by making the appropriate changes in the affected AQDHS-II programs. See Section 4.2.2.8 for a list of these programs and Appendix C for instructions on modifying them.

AEMPARM 028 ABORT - INPUT TRANSACTION FILE OUT OF SEQUENCE

Meaning: The input transactions have not been previously sorted by the parameter transaction sort program, ASRPARM (AQ0150). Any output from this run is unuseable.

Action: Sort the transaction file and resubmit the job.

AEMPARM 029 DISASTER - OUTPUT PARAMETER FILE OUT OF SEQUENCE

Meaning: A program error has produced an output parameter file whose records are not in correct parameter-key sequence. Any output from this run is unuseable.

Action: Contact NADB.

4.2.2.5 Cataloged JCL

4.2.2.5.1 JCL listing - AEMPARM (AQ0070) is executed by the cataloged procedure AQEMP10. This procedure also executes the parameter file transaction sort program ASRPARM (AQ0150). See Figure 4.2.2-f for a listing of AQEMP10.

4.2.2.5.2 Cross-reference of DD names and files

Program Name: ASRPARM (AQ0150)

DD Name	File Description	Input/Output
AQSINPUT	AQDHS-II parameter file transactions	Input
SORTWK01	Sort work file	Internal
AQSOUTPT	Sorted AQDHS-II parameter file transactions	Output
AQSPRINT	Diagnostic report	Output

Program Name: AEMPARM (AQ0070)

DD Name	File Description	Input/Output
AQSTRANS	Sorted AQDHS-II parameter file transactions	Input
AQSOLDPR	Old AQDHS-II parameter file	Input
AQSOPTIN	Option card	Input
AQSNEWPR	New AQDHS-II parameter file	Output

AQSPRINT	Diagnostic report	Output
AQSPINLS	Listing of old AQDHS-II parameter file	Output
AQSPOTLS	Listing of new AQDHS-II parameter file	Output
AQSTXNLS	Listing of sorted AQDHS-II parameter file transactions	Output

4.2.2.5.3 User-supplied JCL - To execute the cataloged procedure AQEMP10, the user must supply the job accounting information and the data set names of the old and new parameter files. See Figure 4.2.2-g for a description of the procedure's substitutable parameters. Two options can be specified for the file maintenance step; the valid option words are FLAGW or NOFLAGW and LIST or NOLIST. For a more detailed description cf the use of these options and the format of the option card see Section 4.2.2.3.

4.2.2.5.4 Sample run streams - The first run stream listed is used to create the initial parameter file from transactions. The option card indicates that warning messages are to be printed, but that the input and output files are not to be listed.

```
//  EXEC  AQEMP10,
//        NEWPARM=PARM0001
//SORT.INPUT DD *
(Parameter transactions)
/*
//UPDATE.AQSOLDPR DD DUMMY
//UPDATE.OPTIONS DD *
FLAGW   NOLIST
/*
//
```

The second run stream shows the initial parameter file being updated. No option card is included, so the default options NOFLAGW and NOLIST are used.

```
//  EXEC  AQEMP10,
//        OLDPARM=PARM0001,
//        NEWPARM=PARM0002
//SORT.INPUT DD *
(Parameter transactions)
/*
//
```

4.2.2.6 Warnings and Special Instructions

The user should remember that a full set of three cards is required to add a record to the parameter file. To delete a record, only the card type 1 transaction is allowed. Also, non-key fields that are left blank on change transactions are not affected in the parameter file.

The majority of the fields in the parameter record are used within the AQDHS-II system either to aid in editing the master file transactions or to supply prose descriptions of the parameter keys in the page headings of AQDHS-II reports. However, certain parameter fields have special functions and should be coded on the transactions with particular accuracy. The minimum detectable and decimal position fields are used in the statistical analysis program, ASTMSST (AQ0200). The standard units conversion factor field is used in the anomaly screening conversion program, ACVANOM (AQ0040), to convert the readings of certain parameters to standard units. Either the standard units fields or the user units fields may be used by the units code conversion program, ACVUNIT (AQ0050), to convert readings and units codes in the master file.

Values do not have to be coded for two of the defined fields in a set of add transactions: the user units code and the user units conversion factor fields. If both of these fields are blank, AEMPARM (AQ0070) will insert appropriate values in the user units fields of the added parameter record based on the units code field in the transaction key. Two warning messages will be generated to let the user know that this is being done. These are, in fact, the only warning messages produced by AEMPARM (AQ0070); when the user has a large number of add transactions that have blank user units fields, he might consider using the NOFLAGW option to suppress the many warning messages that would otherwise be produced.

4.2.2.7 Cost Considerations

The following example provides an estimate of the cost of executing AEMPARM (AQ0070) on an IBM 370/168.

Number of input transaction cards:	300 cards
Number of input parameter file records:	0 records
Number of output parameter file records:	100 records
CPU time:	2.3 seconds
I/O time:	6.9 seconds
Estimated cost:	$2.30

4.2.2.8 Related Programs and Procedures

In the parameter file maintenance procedure, AQEMP10, the parameter file transaction sort program, ASRPARM (AQ0150), is also executed (see Section 4.2.1). Related procedures include: (1) the parameter file COBOL to FORTRAN format conversion procedure, AQCVP10, which invokes the program ACVPFOR (AQ0030); (2) the parameter file detailed report procedure, AQRPP10, which invokes the program ARPPARM (AQ0240); and (3) the parameter exception report procedure, AQRPP20, which invokes the program ARPPMEX (AQ0330).

The following programs use the parameter file and must be modified if the parameter file exceeds the NADB-established size of 200 records:

AEDMSTR (AQ0060)
ASTPRLM (AQ0190)
ACVANOM (AQ0040)
ACVUNIT (AQ0050)
ARPMSTR (AQ0230)
ARPMSST (AQ0270)
ARPINVS (AQ0280)
ARPINVP (AQ0290)
ARPPMEX (AQ0330)

Card 1

Columns	Field Length	Data Type	Description
1	1	Numeric	Card Type (value is 1)
2 - 6	5	Numeric	Parameter Code
7 - 8	2	Numeric	Method Code
9 - 10	2	Numeric	Units Code
11	1	Numeric	Minimum Detectable Decimal Code
12 - 15	4	Numeric	Minimum Detectable*
16 - 45	30	Alphanumeric	Parameter Description
46 - 70	25	Alphanumeric	Collection Method
71 - 79	9		Unused
80	1	Alphabetic	Action Code

---

*If the minimum detectable value is negative it must adhere to the following format: -ddd where d is any digit 0-9. The minimum detectable value must be expressed in the units specified by the units code in columns nine and 10.

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Figure 4.2.2-a. Parameter File Transaction Formats

Card 2

Columns	Field Length	Data Type	Description
1	1	Numeric	Card Type (value is 2)
2 - 6	5	Numeric	Parameter Code
7 - 8	2	Numeric	Method Code
9 - 10	2	Numeric	Units Code
11 - 35	25	Alphanumeric	Analysis Method
36 - 65	30	Alphanumeric	Units Description
66 - 79	14		Unused
80	1	Alphabetic	Action Code

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Figure 4.2.2-a - Continued. Parameter File Transaction Formats

Card 3

Columns	Field Length	Data Type	Description
1	1	Numeric	Card Type (value is 3)
2 - 6	5	Numeric	Parameter Code
7 - 8	2	Numeric	Method Code
9 - 10	2	Numeric	Units Code
11 - 12	2	Numeric	Standard Units Code
13 - 21	9*	Numeric	Standard Units Conversion Factor
22 - 23	2	Numeric	User Units Code**
24 - 32	9*	Numeric	User Units Conversion Factor**
33 - 79	47		Unused
80	1	Alphabetic	Action Code

---

* A five-digit decimal position is assumed; e.g., 2.62 would be coded as '000262000'. Leading zeroes are not required, but trailing zeroes must be coded.

** If the user units code and user units conversion factor are blank on an add transaction, the user units code on the added parameter file record will be the same as the units code in columns nine and 10 of the transaction, and the user units conversion factor will be one.

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Figure 4.2.2-a - Continued. Parameter File Transaction Formats

Action Code: Identifies the intended action of the transaction on the parameter file.
Valid Codes: A-add, C-change, and D-delete
Field Length: 1 character

Analysis Method: A prose description of the analysis method.
Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted analysis methods.
Field Length: 25 characters

Card Type: Identifies the transaction as either card 1, card 2, or card 3.
Valid Codes: 1-3
Field Length: 1 character

Collection Method: A prose description of the collection method.
Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted method codes.
Field Length: 25 characters

Method Code: Identifies both the collection method and the analysis method for the parameter being described.
Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted method codes.
Field Length: 2 characters

Minimum Detectable: Specifies the minimum value detectable using the specified collection and analysis methods. The minimum detectable value must be expressed in the units specified by the units code in card columns nine and 10 of the transaction.

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Figure 4.2.2-b. Parameter File Field Descriptions

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted minimum detectable values.

Field Length: 4 characters

Minimum Detectable Decimal Code: A number which indicates the number of digits in the minimum detectable value that are to fall to the right of the decimal point.

Valid Codes: 0-4

Field Length: 1 character

Parameter Code: Identifies the parameter being described. Refer to APTD-0633

Valid Codes: Refer to the AEROS Manual Series, Volumne V: AEROS Manual of Codes for a complete list of currently accepted parameter codes.

Field Length: 5 characters

Parameter Description: A prose description of the parameter.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted parameter descriptions.

Field Length: 30 characters

Standard Units Code: Identifies the standard units in which values for the given parameter are expressed.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units codes.

Field Length: 2 characters

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Figure 4.2.2-b - Continued. Parameter File Field Descriptions

Standard Units Conversion Factor: The factor which, when multiplied by a value expressed in the units identified in the parameter key, converts that value to the standard units.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units conversion factors.

Field Length: 9 characters with a 5-digit decimal position assumed. Leading zeroes are not required but trailing zeroes must be coded.

Units Code: Identifies the units in which readings will be expressed for each parameter/method code combination. Since the units code is in the parameter file record key, more than one units code may be associated with each parameter/method code combination.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted units codes.

Field Length: 2 characters

Units Description: A prose description of the units.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted units descriptions.

Field Length: 30 characters

User Units Code: Identifies the units in which the user may want readings with the given parameter key to be alternatively expressed. This field may be left blank on an add transaction.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted units codes.

Field Length: 2 characters

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Figure 4.2.2-b - Continued. Parameter File Field Descriptions

User Units Conversion Factor: The factor which, when multiplied by a value expressed in the units identified in the parameter key, converts that value to units expressed by the user units code.

Valid Codes: This field should be left blank on an add transaction if the user units code field is blank. If the user units is the same as the standard units code, the user units conversion factor will be the same as the standard units conversion factor, which may be found in AEROS Manual Series, Volume V: AEROS Manual of Codes. Otherwise, the user must compute the units conversion factor.

Field Length: 9 characters with a 5-digit decimal position assumed. Leading zeroes are not required, but trailing zeroes must be coded.

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Figure 4.2.2-b - Continued. Parameter File Field Descriptions

Columns	Field Length	Description	
1 - 5	5	Parameter Code	Key
6 - 7	2	Method Code	
8 - 9	2	Units Code	
10 - 13	4*	Minimum Detectable	
14	1	Minimum Detectable Decimal Code	
15 - 16	2	Standard Units Code	
17 - 25	9**	Standard Units Conversion Factor	
26 - 27	2	User Units Code	
28 - 36	9**	User Units Conversion Factor	
37 - 66	30	Parameter Description	
67 - 91	25	Collection Method	
92 - 116	25	Analysis Method	
117 - 146	30	Units Description	

* The minimum detectable value is stored in 'zoned decimal format' in the parameter file, i.e. the sign is combined with the right-most character.

** A 5-digit decimal position is assumed; e.g., 2.62 would be stored as '000262000'.

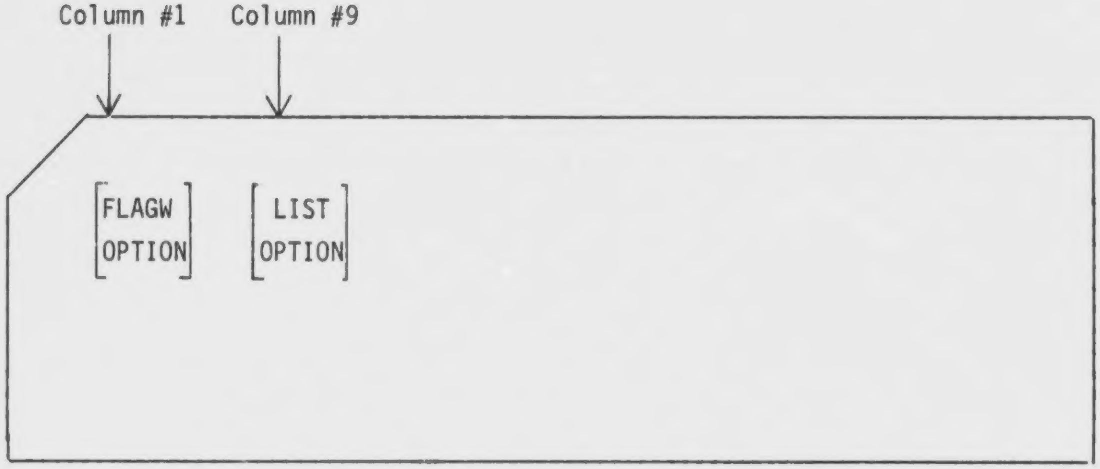
Figure 4.2.2-c. Parameter File Format

```
                         AQDHS-II PARAMETER FILE EDIT AND MAINTENANCE PROGRAM DIAGNOSTIC MESSAGES          PAGE        1
PROGRAM NAME: AEMPARM (AQ0070)
REVISION LEVEL: 1-00
INCORPORATED: OCTOBER 31, 1978
LAST UPDATE #: 24
OPTIONS IN EFFECT: FLAGW   LIST

31110391010100010000 0
                                                                                A
          *** AEMPARM 016 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CODE, ASSUMING UNITS CODE IN KEY
          *** AEMPARM 018 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CONV FAC, ASSUMING UNITY

NUMBER OF INPUT PARAMETER FILE RECORDS:      89
NUMBER OF OUTPUT PARAMETER FILE RECORDS:     89
NUMBER OF INPUT TRANSACTION CARDS:            5
NUMBER OF VALID TRANSACTION CARDS:            5
NUMBER OF REJECTED TRANSACTION CARDS:         0
NUMBER OF DISASTER MESSAGES:                  0
NUMBER OF ABORT MESSAGES:                     0
NUMBER OF ERROR MESSAGES:                     0
NUMBER OF CONDITIONAL MESSAGES:               0
NUMBER OF WARNING MESSAGES                    2
```

Figure 4.2.2-d. Diagnostic Report



The options are subject to the following restrictions:

1. The FLAGW option, if it appears, must begin in column 1 and be written as either FLAGW or NOFLAGW.
2. The LIST option, if it appears, must begin in column 9 and be written as either LIST or NOLIST.

Figure 4.2.2-e. Option Card Format

```
//*
//*   PROCEDURE NAME: AQEMP10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*   THIS PROCEDURE ALLOWS THE USER TO MAINTAIN THE AQDHS-II PARAMETER
//*   FILE
//*
//*
//AQEMP10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROG1=ASRPARM,
//             PROG2=AEMPARM,
//             TIME1='1,0',
//             TIME2='2,0',
//             OLDPARM=AQOLDPRM,
//             NEWPARM=AQNEWPRM,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=10,
//             SCNDARY=5,
//             TEMP=SYSDA,
//             SORTSPC=10,
//             OUT=A
//*
//SORT   EXEC  PGM=&PROG1,
//             TIME=(&TIME1)
//*
//* SORT PARAMETER FILE TRANSACTIONS INTO FILE SEQUENCE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SORTLIB   DD DSNAME=SYS1.SORTLIB,
//             DISP=(SHR,PASS)
//*
//* SORT WORK FILES
//*
//SORTWK01  DD UNIT=&TEMP,
//             SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//SORTWK02  DD UNIT=(&TEMP,SEP=SORTWK01),
//             SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//SORTWK03  DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02)),
//             SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//* INPUT DATA SET - PARAMETER FILE TRANSACTIONS
//*
//AQSINPUT  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - SORTED PARAMETER FILE TRANSACTIONS
//*
//AQSOUTPT  DD UNIT=&TEMP,
```

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Figure 4.2.2-f. Cataloged Procedure AQEMP10

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```
//             DISP=(NEW,PASS,DELETE),
//             SPACE=(TRK,&SORTSPC,RLSE),
//             DSNAME=&&TRANS,
//             DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//*
//UPDATE  EXEC PGM=&PROG2,
//             TIME=(&TIME2)
//*
//* MAINTAIN PARAMETER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - TRANSACTIONS
//*
//AQSTRANS  DD DSNAME=&&TRANS,
//             DISP=(OLD,DELETE)
//*
//* INPUT DATA SET - OLD PARAMETER FILE
//*
//AQSOLDPR  DD DSN=&PROJECT..DATA.&OLDPARM,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - NEW PARAMETER FILE
//*
//AQSNEWPR  DD DSNAME=&PROJECT..DATA.&NEWPARM,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SCNDARY),RLSE),
//             UNIT=&UNIT
//*
//* INPUT DATA SET - OPTION CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - LIST OF INPUT TRANSACTIONS
//*
//AQSTXNLS  DD SYSOUT=&OUT
```

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Figure 4.2.2-f - Continued. Cataloged Procedure AQEMP10

```
//*
//* OUTPUT DATA SET - LIST OF INPUT PARAMETER FILE
//*
//AQSPINLS  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - LIST OF OUTPUT PARAMETER FILE
//*
//AQSPOTLS  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

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Figure 4.2.2-f - Continued. Cataloged Procedure AQEMP10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g.,CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQOLDPRM would be the full data set name of the old parameter file)
PROG1	ASRPARM	Parameter file transaction sort program
PROG2	AEMPARM	Parameter file maintenance program
TIME1	'1,0'	Time (minutes, seconds) allocated for execution of ASRPARM
TIME2	'2,0'	Time (minutes, seconds) allocated for execution of AEMPARM
OLDPARM	AQOLDPRM	Lowest-level index of old parameter file
NEWPARM	AQNEWPRM	Lowest-level index of new parameter file
UNIT	3330	Unit type to which new parameter file is to be written
SERIAL	CDHSPK	Volume serial number of the volume to which new parameter file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of new parameter file
SPCUNIT	TRK	Units in which space for new parameter file is to be allocated
PRIMARY	10	Primary space allocation for new parameter file
SCNDARY	5	Secondary space allocation for new parameter file
TEMP	SYSDA	Unit type for temporary work space
SORTSPC	10	Number of tracks to be allocated for the sort work space
OUT	A	SYSOUT class for all print files

Figure 4.2.2-g. Substitutable Parameters for AQEMP10

4.3 SITE FILE

4.3.1 SITE FILE TRANSACTION SORT PROGRAM - ASRSITE (AQ0160)

4.3.1.1 Description

ASRSITE (AQ0160) sorts site file transactions into the sequence required by the site file maintenance program AEMSITE (AQ0080); Figure 4.3.1-a details this sort order. All site file transactions must be sorted by ASRSITE (AQ0160) before they can be used to update (or create) the site file. See Section 4.3.2 for additional information on the parameter file transactions.

4.3.1.2 File Formats

Input to ASRSITE (AQ0160) consists solely of the site file transactions. See Section 4.3.2.2 for the site file transaction format.

ASRSITE (AQ0160) produces two output files: a file containing the sorted site file transactions and a diagnostic report. The transactions are in the same sequence as the site file and can be used as input to the site file maintenance program AEMSITE (AQ0080). An example of the diagnostic report is shown in Figure 4.3.1-b.

4.3.1.3 Options

There are no options.

4.3.1.4 Error Messages

There are no error messages.

4.3.1.5 Cataloged JCL

ASRSITE (AQ0160) should always be executed in conjunction with the site file maintenance program AEMSITE (AQ0080). See Section 4.3.2.5 for a discussion of the cataloged procedure AQEMS10, which executes both programs.

4.3.1.6 Warnings and Special Instructions

Note that the COBOL sort verb is used in this program; therefore, the collating sequence for alphanumeric fields is determined by the computer at the user's particular installation.

In addition to the diagnostic report produced by ASRSITE (AQ0160), messages generated by the sort-merge package will be printed. The format and content, as well as the physical location, of these messages depend upon the user's particular installation.

4.3.1.7 Cost Considerations

The following estimates are for the execution of ASRSITE (AQ0160) on an IBM 370/168:

Number of sorted site file transactions:	3 transactions
CPU time:	.4 seconds
I/O time:	5.6 seconds
Total time:	6.0 seconds
Estimated cost:	$1.11

4.3.1.8 Related Programs and Procedures

ASRSITE (AQ0160) should always be executed in conjunction with the site file maintenance program AEMSITE (AQ0080). The cataloged procedure AQEMS10 executes both programs.

Record Position	Description	Sort Order
1 - 2	State Code	Ascending
3 - 6	Area Code	Ascending
7 - 9	Site Code	Ascending
10	Agency Code	Ascending
11 - 12	Project Code	Ascending
13 - 15	AQCR Code	Ascending
16 - 19	County Code	Ascending

Figure 4.3.1-a. Sort Sequence for Site File Transactions

```
                    AQDHS-II SITE FILE TRANSACTION SORT PROGRAM  -  DIAGNOSTIC REPORT                              PAGE  1

PROGRAM NAME: ASRSITE (AQ0160)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978


NUMBER OF TRANSACTIONS READ:             36
NUMBER OF TRANSACTIONS WRITTEN:          36
```

Figure 4.3.1-b. Diagnostic Report

4.3.2 SITE FILE MAINTENANCE PROGRAM - AEMSITE (AQ0080)

4.3.2.1 Description

AEMSITE (AQ0080) creates and updates a file containing valid site codes for a user's AQDHS-II installation plus a description associated with each site code.

The site file transactions must be sorted by the site file transaction sort program ASRSITE (AQ0160) prior to being processed by AEMSITE (AQ0080). A transaction is sorted according to the value of the transaction key which contains the coded identification of the site: state code, area code, site code, agency code, and project code. AEMSITE (AQ0080) does not check the sequence of the transactions since it is assumed that they have been sorted by ASRSITE (AQ0160). See Section 4.3.1 for a discussion of the site file transaction sort program.

If a transaction key matches a key in the site file and all remaining transaction fields (AQCR, county, SLAMS/NAMS ID, and site description) are blank, then the record is deleted from the site file. If the remaining fields are not blank, then the AQCR and county fields of the transaction are edited. If they are numeric, then these fields, along with the SLAMS/NAMS ID and site description fields, replace the corresponding fields of the site file record. If they are not numeric, the transaction is rejected and an error message is generated. If no matching key is found, a new site file record is created unless the remaining transaction fields are blank; in this case an error message is generated and the transaction is rejected.

4.3.2.2 File Formats

Input to AEMSITE (AQ0080) consists of an initial sorted transaction file and the current AQDHS-II site file. However, if the site file is being created there will be no input AQDHS-II site file. See Figure 4.3.1-a for a description of the site transaction sort order, Figure 4.3.2-a for a description of the AQDHS-II site file record format, and Figure 4.3.2-b for the AQDHS-II site file data definitions.

Output consists of a new AQDHS-II site file and a print file containing a diagnostic report. AEMSITE (AQ0080) does not check the sequence of input or output files (see Section 4.3.2.6). The diagnostic report contains a printed image of each transaction and the associated action taken by the program (add, replace, delete, rejected). A rejected transaction will be followed by an error message indicating the reason for rejection. See Figure 4.3.2-c for a sample diagnostic report.

4.3.2.3 Options

There are no options.

4.3.2.4 Error Messages

*** AEMSITE 001 ERROR - NO MATCHING KEY ON MASTER FILE - DELETE REQUEST IGNORED - CARD REJECTED

Meaning: A delete was specified for a non-existent record. The transaction was not processed.

Action: Check the transaction to insure that it contains the proper data. If the transaction does not contain the proper data, correct the error and resubmit the job.

*** AEMSITE 002 ERROR - COLUMN 01 - STATE CODE BLANK - TRANSACTION REJECTED

Meaning: There is no state code on the transaction card.

Action: Correct the error and resubmit the job.

*** AEMSITE 003 ERROR - COLUMN 13 - NON-NUMERIC AQCR - TRANSACTION REJECTED

Meaning: The AQCR field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 004 ERROR - COLUMN 16 - NON-NUMERIC COUNTY-CODE - TRANSACTION REJECTED

Meaning: The county field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 005 ERROR - COLUMN 03 - NON-NUMERIC AREA CODE - TRANSACTION REJECTED

Meaning: The area field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 006 ERROR - COLUMN 07 - NON-NUMERIC SITE CODE - TRANSACTION REJECTED

Meaning: The site field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 007 ERROR - COLUMN 10 - NON-ALPHABETIC AGENCY CODE - TRANSACTION REJECTED

Meaning: The agency field on the transaction card is not alphabetic.

Action: Correct the error and resubmit the job.

*** AEMSITE 008 ERROR - COLUMN 11 - NON-NUMERIC PROJECT CODE - TRANSACTION REJECTED

Meaning: The project field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

4.3.2.5 Cataloged JCL

4.3.2.5.1 JCL listing - AEMSITE (AQ0080) can be run by executing the cataloged procedure AQEMS10. This procedure executes ASRSITE (AQ0160) first so that only sorted transactions are input to AEMSITE (AQ0080). See Figure 4.3.2-d for a listing of this procedure.

4.3.2.5.2 Cross-reference of DD names and files

Program Name: ASRSITE (AQ0160)

DD Name	File Description	Input/Output
AQSINPUT	Site file transactions	Input
SORTWK01	Sort work file	Internal
AQSOUTPT	Sorted site file transactions	Output
AQSPRINT	Diagnostic report	Output

Program Name: AEMSITE (AQ0080)

DD Name	File Description	Input/Output
AQSTRANS	Sorted site file transactions	Input
AQSOLDMS	Current AQDHS-II site file	Input
AQSNEWMS	New or updated AQDHS-II site file	Output
AQSPRINT	Diagnostic report	Output

4.3.2.5.3 User-supplied JCL - The user must supply the site file transactions and the data set names of the current and updated AQDHS-II site files. See Figure 4.3.2-e for a description of the procedure's substitutable parameters.

4.3.2.5.4 Sample run stream - The following run stream would create the AQDHS-II site file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.SITEFILE':

```
// EXEC  AQEMS10,
//       NEWMSTR=SITEFILE
//SORT.INPUT DD *
(Site file transaction cards)
/*
//UPDATE.AQSOLDMS DD DUMMY
```

The following run stream would produce the updated AQDHS-II site file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQNEWSTE' from the existing AQDHS-II site file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQOLDSTE':

```
// EXEC  AQEMS10,
//       OLDMSTR=AQOLDSTE,
//       NEWMSTR=AQNEWSTE
//SORT.INPUT DD *
(Site file transaction cards)
/*
```

4.3.2.6 Warnings and Special Instructions

To insure that the AQDHS-II site file is produced in the proper sequence the user must sort the transactions using ASRSITE (AQ0160) prior to executing AEMSITE (AQ0080). If the transactions are processed out of sequence, the new AQDHS-II site file might be out of sequence; this would cause erroneous output from programs which access this file.

4.3.2.7 Cost Considerations

A test run of AEMSITE (AQ0080) was executed on an IBM 370/168 to create a test AQDHS-II site file. The following estimates are from that test run:

Input site file transactions: 24 transactions
Current input site file records: 0 records
Updated output site file records: 24 records
CPU time: 0.2 second
I/O time: 3.1 seconds
Total time: 3.3 seconds

Estimated cost: $.95

4.3.2.8 Related Programs and Procedures

AEMSITE (AQ0080) must be run in conjunction with ASRSITE (AQ0160) to insure that the AQDHS-II site file is maintained in the proper sequence. The cataloged procedure AQEMS10 executes both programs.

Column #	Field Length	Data Type	Description	
1 - 2	2	Numeric	State Code	Key
3 - 6	4	Numeric	Area Code	
7 - 9	3	Numeric	Site Code	
10	1	Alphabetic	Agency Code	
11 - 12	2	Numeric	Project Code	
13 - 15	3	Numeric	AQCR Code	
16 - 19	4	Numeric	County Code	
20	1	Alphanumeric	SLAMS/NAMS ID	
21 - 80	60	Alphanumeric	Site Description	

Figure 4.3.2-a. AQDHS-II Site File Record Format

Agency Code: Identifies the agency responsible for the sampling site.

Valid Codes: See Appendix A, Table 1. Contact the EPA Regional Office for additional information.

Field Length: 1 character

AQCR Code: Identifies the Air Quality Control Region in which the sampling site is located.

Valid Codes: The valid codes are 0-247. For additional information, see the AEROS Manual Series, Volume V: AEROS Manual of Codes.

Field Length: 3 characters

Area Code: Identifies the area within the state in which the sampling site is located.

Valid Codes: Contact the EPA Regional Office for the valid codes.

Field Length: 4 characters

County Code: Identifies the county in which the sampling site is located.

Valid Codes: The code must be numeric. For additional information, see the AEROS Manual Series, Volume V: AEROS Manual of Codes.

Field Length: 4 characters

Project Code: Identifies the project associated with the sampling site.

Valid Codes: See Appendix A, Table 2.

Field Length: 2 characters

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Figure 4.3.2-b. AQDHS-II Site File Data Definitions

Site Code: Identifies the site at which the sample was taken.

Valid Codes: Contact the EPA Regional Office to obtain a list of valid, recognized site codes.

Field Length: 3 characters

Site Description: A prose description of the sampling site.

Field Length: 60 characters

SLAMS/NAMS ID: Indicates whether the sampling site is a State and Local Air Monitoring Station (SLAMS) or a National Air Monitoring Station (NAMS). The code must be alphabetic.

Valid Codes: EPA has not established valid codes.

Field Length: 1 character

State Code: Identifies the state (or other geographic division) in which the sampling site is located.

Valid Codes: The valid codes are 01-55. For additional information, see the AEROS Manual Series, Volume V: AEROS Manual of Codes.

Field Length: 2 characters

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Figure 4.3.2-b - Continued. AQDHS-II Site File Data Definitions

```
                    AQDHS-II SITE FILE MAINTENANCE PROGRAM  -  DIAGNOSTIC REPORT                PAGE    1
PROGRAM NAME: AEMSITE (AQ0080)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

INPUT/ERRORS                          ACTION

100001001E020491080 N.10TH. AVE., JACKSONVILLE, DUVAL CO.
                                      *** ADDED

120001001C010600080 MOUNTAIN ROAD, HILO, HAWAII CO.
                                      *** ADDED

120001002C010600140 PEARL HARBOR, HONOLULU, HONOLULU CO.
                                      *** ADDED

120001003C010600140 WAIKIKI, HONOLULU, HONOLULU CO.
                                      *** ADDED

120001004C010600140 SCHOFIELD BARRACKS, HONOLULU CO.
                                      *** ADDED

120001005C010600140 PEARL CITY, HONOLULU CO.
                                      *** ADDED

120001006C010600140 WAHIAWA, HONOLULU CO.
                                      *** ADDED

120001007C010600140 KANEOHE, HONOLULU CO.
                                      *** ADDED

RECORDS ADDED:                36
RECORDS DELETED:               0
RECORDS REPLACED:              0
OLD SITE FILE COUNT:           0
NEW SITE FILE COUNT:          36
ERROR COUNT:                   0
```

Figure 4.3.2-c. Diagnostic Report

```
//*                                                                     00000100
//*   PROCEDURE NAME: AQEMS10                                           00000200
//*   REVISION LEVEL: 1-00                                              00000300
//*   LAST UPDATE #: 24                                                 00000400
//*   DATE INCORPORATED: OCTOBER 31,1978                                00000500
//*                                                                     00000600
//*   THIS PROCEDURE ALLOWS THE USER TO MAINTAIN THE AQDHS-II SITE FILE 00000700
//*                                                                     00000800
//*                                                                     00000900
//AQEMS10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',                    00001000
//             PROG1=ASRSITE,                                           00001100
//             PROG2=AEMSITE,                                           00001200
//             TIME1='1,0',                                             00001300
//             TIME2='1,0',                                             00001400
//             OLDSITE=AQOLDSTE,                                        00001500
//             NEWSITE=AQNEWSTE,                                        00001600
//             UNIT=3330,                                               00001700
//             SERIAL=CDHSPK,                                           00001800
//             DISP='NEW,CATLG,DELETE',                                 00001900
//             SPCUNIT=TRK,                                             00002000
//             PRIMARY=10,                                              00002100
//             SECNDRY=5,                                               00002200
//             TEMP=SYSDA,                                              00002300
//             SORTSPC=10,                                              00002400
//             OUT=A                                                    00002500
//*                                                                     00002600
//SORT    EXEC PGM=&PROG1,                                              00002700
//             TIME=(&TIME1)                                            00002800
//*                                                                     00002900
//* SORT SITE FILE TRANSACTIONS INTO FILE SEQUENCE                      00003000
//*                                                                     00003100
//STEPLIB DD DSNAME=&PROJECT..LOAD,                                     00003200
//           VOLUME=(PRIVATE,RETAIN),                                   00003300
//           DISP=(SHR,PASS)                                            00003400
//SORTLIB   DD DSNAME=SYS1.SORTLIB,                                     00003500
//             DISP=(SHR,PASS)                                          00003600
//*                                                                     00003700
//SYSOUT    DD SYSOUT=&OUT                                              00003800
//*                                                                     00003900
//SORTWK01  DD UNIT=&TEMP,                                              00004000
//             SPACE=(TRK,&SORTSPC,,CONTIG)                             00004100
//*                                                                     00004200
//SORTWK02  DD UNIT=(&TEMP,SEP=SORTWK01),                               00004300
//             SPACE=(TRK,&SORTSPC,,CONTIG)                             00004400
//*                                                                     00004500
//SORTWK03  DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02)),                    00004600
//             SPACE=(TRK,&SORTSPC,,CONTIG)                             00004700
//*                                                                     00004800
//* INPUT DATA SET - SITE FILE TRANSCATIONS                             00004900
//*                                                                     00005000
//AQSINPUT  DD DDNAME=INPUT,                                            00005100
//             DCB=BLKSIZE=80                                           00005200
//*                                                                     00005300
//* OUTPUT DATA SET - SORTED SITE FILE TRANSACTIONS                     00005400
//*                                                                     00005500
//AQSOUTPT  DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02,SORTWK03)),           00005600
//             DISP=(NEW,PASS,DELETE),                                  00005700
//             SPACE=(TRK,(&PRIMARY,&SECNDRY),RLSE),                    00005800
```

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Figure 4.3.2-d. Cataloged Procedure AQEMS10

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```
//             DSNAME=&&TRANS,                                          00005900
//             DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                        00006000
//*                                                                     00006100
//* OUTPUT DATA SET - DIAGNOSTIC REPORT                                 00006200
//*                                                                     00006300
//AQSPRINT DD SYSOUT=&OUT                                               00006400
//*                                                                     00006500
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006600
//*                                                                     00006700
//SYSPRINT  DD SYSOUT=&OUT                                              00006800
//*                                                                     00006900
//SYSOUT    DD SYSOUT=&OUT                                              00007000
//*                                                                     00007100
//SYSDBOUT  DD SYSOUT=&OUT                                              00007200
//*                                                                     00007300
//SYSDTERM  DD SYSOUT=&OUT                                              00007400
//*                                                                     00007500
//SYSUDUMP  DD SYSOUT=&OUT                                              00007600
//*                                                                     00007700
//*                                                                     00007800
//UPDATE  EXEC PGM=&PROG2,                                              00007900
//             REGION=60K,                                              00008000
//             TIME=(&TIME2)                                            00008100
//*                                                                     00008200
//* MAINTAIN SITE FILE                                                  00008300
//*                                                                     00008400
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00008500
//             VOLUME=(PRIVATE,RETAIN),                                 00008600
//             DISP=(SHR,PASS)                                          00008700
//          DD DSNAME=SYS1.COBLIB,                                      00008800
//             DISP=(SHR,PASS)                                          00008900
//*                                                                     00009000
//* INPUT DATA SET - TRANSACTIONS                                       00009100
//*                                                                     00009200
//AQSTRANS  DD DSNAME=&&TRANS,                                          00009300
//             DISP=(OLD,DELETE)                                        00009400
//*                                                                     00009500
//* INPUT DATA SET - OLD SITE FILE                                      00009600
//*                                                                     00009700
//AQSOLDMS  DD DSNAME=&PROJECT..DATA.&OLDSITE,                          00009800
//             VOLUME=(PRIVATE,RETAIN),                                 00009900
//             DISP=(SHR,PASS)                                          00010000
//*                                                                     00010100
//* OUTPUT DATA SET - NEW SITE FILE                                     00010200
//*                                                                     00010300
//AQSNEWMS  DD UNIT=&UNIT,                                              00010400
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),                     00010500
//             DISP=(&DISP),                                            00010600
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),               00010700
//             DSNAME=&PROJECT..DATA.&NEWSITE                           00010800
//*                                                                     00010900
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00011000
//*                                                                     00011100
//AQSPRINT  DD SYSOUT=&OUT                                              00011200
//*                                                                     00011300
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00011400
//*                                                                     00011500
//SYSPRINT  DD SYSOUT=&OUT                                              00011600
```

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Figure 4.3.2-d - continued. Cataloged Procedure AQEMS10

```
//*                                                                     00011700
//SYSOUT     DD SYSOUT=&OUT                                             00011800
//*                                                                     00011900
//SYSDBOUT   DD SYSOUT=&OUT                                             00012000
//*                                                                     00012100
//SYSDTERM   DD SYSOUT=&OUT                                             00012200
//*                                                                     00012300
//SYSUDUMP   DD SYSOUT=&OUT                                             00012400
//*                                                                     00012500
```

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Figure 4.3.2-d - continued. Cataloged Procedure AQEMS10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., the full data set name of the AQDHS-II site file would be CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQOLDSTE)
PROG1	ASRSITE	Site file transaction sort program
PROG2	AEMSITE	Site file maintenance program
TIME1	'1,0'	Time allocation for execution of ASRSITE
TIME2	'1,0'	Time allocation for execution of AEMSITE
OLDMSTR	AQOLDSTE	Lowest-level index of current AQDHS-II site file
NEWMSTR	AQNEWSTE	Lowest-level index of new or updated AQDHS-II site file
UNIT	3330	Unit type to which new or updated AQDHS-II site file is to be written
SERIAL	CDHSPK	Volume ID to which new or updated AQDHS-II site file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of new or updated AQDHS-II site file
SPCUNIT	TRK	Units in which space for new or updated AQDHS-II site file is to be allocated
PRIMARY	10	Primary space allocation for new or updated AQDHS-II site file
SECNDRY	5	Secondary space allocation for new or updated AQDHS-II site file
TEMP	SYSDA	Unit type specified for temporary sort work files
SORTSPC	10	Space allocation for temporary sort work files
OUT	A	SYSOUT class for all print files

Figure 4.3.2-e. Substitutable Parameters for AQEMS10

4.4 PARAMETER STANDARDS FILE

4.4.1 PARAMETER STANDARDS FILE TRANSACTION SORT PROGRAM - ASRSTND (AQ0170)

4.4.1.1 Description

ASRSTND (AQ0170) sorts parameter standards file transactions into the sequence required by the parameter standards file maintenance program AEMSTND (AQ0090); Figure 4.4.1-a details this sort order. All parameter standards file transactions must be sorted by ASRSTND (AQ0170) before they can be used to update (or create) the parameter standards file. See Section 4.4.2 for additional information on the parameter standards file transactions.

4.4.1.2 File Formats

Input to ASRSTND (AQ0170) consists solely of the parameter standards file transactions. Refer to Section 4.4.2.2 for the parameter standards file transaction format.

ASRSTND (AQ0170) produces two output files: a file containing the sorted parameter standards file transactions and a diagnostic report. The transactions are in the same sequence as the parameter standards file and can be used as input to the parameter standards file maintenance program AEMSTND (AQ0090). An example of the diagnostic report is shown in Figure 4.4.1-b.

4.4.1.3 Options

There are no options.

4.4.1.4 Error Messages

There are no error messages.

4.4.1.5 Cataloged JCL

ASRSTND (AQ0170) should always be executed in conjunction with the parameter standards file maintenance program AEMSTND (AQ0090). See Section 4.4.2.5 for a discussion of the cataloged procedure AQEMD10, which executes both programs.

4.4.1.6 Warnings and Special Instructions

Note that the COBOL sort verb is used in this program; therefore, the collating sequence for alphanumeric fields is determined by the computer at the user's particular installation.

In addition to the diagnostic report produced by ASRSTND (AQ0170), messages generated by the sort-merge package will be printed. The format and content, as well as the physical location, of these messages depend upon the user's particular installation.

4.4.1.7 Cost Considerations

The following estimates are for the execution of ASRSTND (AQ0170) on an IBM 370/168:

Number of parameter standards file transactions:	80 transactions
CPU time:	.4 second
I/O time:	7.7 seconds
Total time:	8.1 seconds
Estimated cost:	$1.34

4.4.1.8 Related Programs and Procedures

ASRSTND (AQ0170) should always be executed in conjunction with the parameter standards file maintenance program AEMSTND (AQ0090). The cataloged procedure AQEMD10 executes both programs.

Record Position	Description	Sort Order
1 - 5	Parameter Code	Ascending
6	Standard type	Ascending
7 - 8	Standard Number	Ascending
9	Standard Flag	Ascending

Figure 4.4.1-a. Sort Sequence for Parameter Standards File Transactions

```
                    AQDHS-II PARAMETER STANDARDS FILE TRANSACTION SORT PROGRAM  -  DIAGNOSTIC REPORT          PAGE    1

PROGRAM NAME: ASRSTND (AQ0170)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978


NUMBER OF TRANSACTIONS READ:           85
NUMBER OF TRANSACTIONS WRITTEN:        85
```

Figure 4.4.1-b. Diagnostic Report

4.4.2 PARAMETER STANDARDS FILE MAINTENANCE PROGRAM - AEMSTND (AQ0090)

4.4.2.1. Description

AEMSTND (AQ0090) creates and maintains the AQDHS-II parameter standards file. It uses information from input parameter standards transactions to add, delete, or replace records on an existing parameter standards file. To create a parameter standards file, AEMSTND (AQ0090) is executed with add transactions and no input parameter standards file.

The format of the parameter standards file is shown in Figure 4.4.2-a. Each record in the parameter standards file contains a primary standard and/or a secondary standard.

The parameter standards file is used by the master file detailed report program, ARPMSTR (AQ0230), as the source of the federal and state parameter standards. Examples of the master file detailed report are shown in Figure 6.2.3-a. ARPMSTR (AQ0230) selects the parameter standards from the parameter standards file in the following manner. The records in the parameter standards file are stored in a table. The table is searched for a match of the parameter and units codes on the master file. If more than one match of parameter and units codes is found, the first match encountered is used in the detailed report. If no match of the parameter and units codes is found, but one or more match of the parameter code is found the first such match is used. This procedure is followed for both the federal and state standards. If no match is found for either standard, then that standard will be omitted from the report.

Since the standard number field is a part of the key of the parameter standards file, it partially determines the order of records in the parameter standards file and thereby affects the priority used in selecting parameter standards. The user should insure that for each parameter code standard type, and units code, the lowest standard number is used for the Standard he wants to appear in the master file detailed report.

The format of the parameter standard file transactions is shown in Figure 4.4.2-b. The key of each transaction contains the following information: parameter code, standard type, standard number, and standard flag (primary or secondary standard). To delete or replace a standard on the parameter standards file, a transaction with exactly the same key must be entered. If the standard description is not blank, the corresponding standard will be replaced in the file; if it is blank, the primary and secondary standard (i.e. the entire parameter standards record) will be deleted if the standard flag is '1', or the secondary standard will be deleted if the standard flag is '2'. To add a standard to the parameter standards file, a transaction must be entered that has a key that is not in the existing file and has a non-blank description field.

Figure 4.4.2-c presents a description of parameter standards transaction fields and their valid codes.

4.4.2.2. File Formats

Input to AEMSTND (AQ0090) consists of an AQDHS-II parameter standards file and a parameter standards transaction file; the formats of these files are shown in Figure 4.4.2-a and Figure 4.4.2-b, respectively.

Input transactions must be sorted into the sequence shown in Figure 4.4.1-a prior to their use by this program. Sorting can be done by executing the parameter standards sort program ASRSTND (AQ0170).

Output consists of an updated AQDHS-II parameter standards file and a diagnostic report. The diagnostic report contains the standard program update messages, a list of the input transactions with the action taken by AEMSTND (AQ0090), any applicable diagnostic messages, and the following statistical messages: (1) the number of standards added; (2) the number of standards deleted; (3) the number of standards replaced; (4) the number of input parameter standards file records; (5) the number of output parameter standards file records; and, (6) the number of errors detected. An example of the diagnostic report is shown in Figure 4.4.2-d.

4.4.2.3 Options

There are no options.

4.4.2.4 Error Messages

AEMSTND 001 ERROR - NON-NUMERIC PARAMETER CODE - TRANSACTION REJECTED

Meaning: The parameter code field columns 1-5 contains alphabetic characters.

Action: Correct the parameter code and resubmit the transaction.

AEMSTND 002 ERROR - INVALID FEDERAL OR STATE FLAG

Meaning: An illegal character has been found in the standard type field (column 6).

Action: Correct the standard type (F for federal or S for state standard) and resubmit the transaction.

AEMSTND 003 ERROR - NON-NUMERIC STANDARD NUMBER CODE

Meaning: Alphabetic characters have been found in the standard number field (columns 7-8).

Action: Correct the standard number and resubmit the transaction.

AEMSTND 004 ERROR - INVALID PRIMARY/SECONDARY CODE

Meaning: An illegal character has been found in the standard flag field (column 9).

Action: Correct the standard flag (1 for primary or 2 for secondary) and resubmit the transaction.

AEMSTND 005 ERROR - NON-NUMERIC UNITS-CODE

Meaning: An alphabetic character has been found in the units code field (columns 10-11).

Action: Correct the units code and resubmit the transaction.

AEMSTND 006 ERROR - NO MATCHING KEY ON MASTER FILE - DELETE REQUEST IGNORED - SET REJECTED

Meaning: No record in the input parameter standards file has the same key information as the indicated transaction; therefore, no record can be deleted.

Action: Correct the key information on the indicated transaction if "replace" or "add" action is intended rather than "delete", columns 12-61 (standard description) should not be blank. Resubmit the transaction.

4.4.2.5 Cataloged JCL

4.4.2.5.1 JCL Listing - AEMSTND (AQ0090) can be run by executing the cataloged procedure AQEMD10. This procedure also executes the parameter standards sort program ASRSTND (AQ0170).

See Figure 4.4.2-e for a listing of this procedure.

4.4.2.5.2 Cross Reference of DD names and files

Program Name: ASRSTND (AQ0170)

DD Name	File Description	Input/Output
AQSINPUT	AQDHS-II parameter standards file transactions	
SORTWK01	Sort work file	Internal
AQSOUTPT	Sorted AQDHS-II parameter standards file transactions	
AQSPRINT	Diagnostic report	Output

Program Name: AEMSTND (AQ0090)

DD Name	File Description	Input/Output
AQSCARDS	Sorted AQDHS-II parameter standards file transactions	Input
AQSOLDFL	Old AQDHS-II parameter standards file	Input
AQSSTDFL	New (or updated) AQDHS-II parameter standards file	Output
AQSPRINT	Diagnostic report	

4.4.2.5.3 User-supplied JCL -To execute the cataloged procedure AQEMD10, the user must supply job accounting information, the input transaction card file, and the data set names of the old and new (or updated) AQDHS-II parameter standards files. Other JCL elements likely to be supplied by the user are the time parameters. See Figure 4.4.2-f for a description of the procedure's substitutable parameters.

4.4.2.5.4 Sample run streams - The following run stream would produce an updated AQDHS-II parameter standards file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.HTSTNDAB' from an existing AQDHS-II parameter standards file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.HTSTNDAA' and an input parameter standards transaction card file.

```
// EXEC  AQEMD10
//       OLDMSTR=HTSTNDAA,
//       NEWMSTR=HTSTNDAB
//SORT.INPUT  DD *
(parameter standards transactions)
/*
```

4.4.2.6 User Warnings

For proper updating, the input AQDHS-II parameter standards transactions must be sorted into the correct sequence (see Section 4.4.2.2).

Extra care should be taken in providing transaction key information to insure that the right record is added, replaced, or deleted.

The standard number field determines the priority to be used by program ARPMSTR (AQ0230) in selecting the parameter standards for the master file detailed report (refer to 4.4.2.1). The user should insure that for each parameter code, standard type, and units code, the lowest standard number is used for the standard he wants in the master file detailed report.

4.4.2.7 Cost Considerations

The following estimates are for the execution of AEMSTND (AQ0090) on an IBM 370/168:

Number of sorted parameter standards file transactions:	43 transactions
CPU time:	.2 seconds
I/O time:	3.2 seconds
Total time:	3.4 seconds
Estimated cost:	$.68

4.4.2.8 Related Programs and Procedures

ASRSTND (AQ0170) should always be executed prior to AEMSTND (AQ0090).

The cataloged procedure AQEMD10 executes both programs.

Record Field	Field Length	Description	
1 - 5	5	Parameter code	Record key
6	1	Standard type	
7 - 8	2	Standard number	
9 - 10	2	Primary standard units code	
11 - 60	50	Primary standard	
61 - 62	2	Secondary standard units code	
63 -112	50	Secondary standard units code	

Figure 4.4.2-a. AQDHS-II Parameter Standards File Format

Card Column	Field Length	Data Type	Description	
1 - 5	5	Numeric	Parameter code	Transaction Key
6	1	Alphabetic	Standard type (F or S)	
7 - 8	2	Numeric	Standard number	
9	1	Numeric	Standard flag (1 or 2)	
10 - 11	2	Numeric	Units code	
12 - 61	50	Alphanumeric	Standard description	
62 - 60	19		Not used	

Figure 4.4.2-b. AQDHS-II Parameter Standards File Transaction Format

Parameter code:	Identifies the parameter for which a standard is being specified.
Valid codes:	Refer to AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted parameter codes.
Field length:	Five characters.
Standard description:	A prose description of the standard.
Field length:	50 characters.
Standard flag:	Identifies the standard as a primary standard (1) or a secondary standard (2).
Valid codes:	1, 2
Field length:	One character
Standard number:	A number that identifies the priority to be used in selection standards from the parameter standards file (refer to 4.4.2.1).
Field length:	Two characters
Standard type:	Identifies the standard as a federal standard (F) or a state standard (S).
Valid Codes:	F, S.
Field length:	One character.

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Figure 4.4.2-c. Parameter Standards File Transaction Field Descriptions

Units code:	Indentifies the units in which the standard is expressed.
Valid codes:	Refer to AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted units codes.
Field length:	Two characters.

(page 2 of 2)

Figure 4.4.4-c - Continued. Parameter Standards File Transaction Field Descriptions

```
                    AQDHS-II PARAMETER STANDARDS FILE MAINTENANCE PROGRAM  -  DIAGNOSTIC REPORT            PAGE     1
 PROGRAM NAME:  AEMSTND (AQ0090)
 REVISION LEVEL: 1-00
 LAST UPDATE #: 24
 DATE INCORPORATED: OCTOBER 31, 1978


INPUT/ERRORS                          ACTION


44201F02107   0.08 PARTS/MILLION, 1 HR. MAX, 1 PER YR
                                  *** ADDED

44201F02207   0.08 PARTS/MILLION, 1 HR MAX, 1 PER HR.
                                  *** ADDED

44201S01101   155 UG/M3 (25 C) ,1 HR. MAX, 1 PER YR.
                                  *** ADDED

44201S01201   155 UG/M3 (25 C) ,1 HR. MAX, 1 PER YR.
                                  *** ADDED

44201S02107   0.06 PARTS/ MILLION, 1 HR. MAX, 1 PER YR.
                                  *** ADDED

44201S02207   0.06 PARTS/ MILLION, 1 HR. MAX, 1 PER YR.
                                  *** ADDED

NUMBER OF STANDARDS ADDED:                                 85
NUMBER OF STANDARDS DELETED:                                0
NUMBER OF STANDARDS REPLACED:                               0
NUMBER OF INPUT PARAMETER STANDARDS FILE RECORDS:           0
NUMBER OF OUTPUT PARAMETER STANDARDS FILE RECORDS:         45
NUMBER OF ERRORS DETECTED:                                  0
```

Figure 4.4.2-d. Diagnostic Report

```
//*
//*    PROCEDURE NAME: AQEMD10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO MAINTAIN THE PARAMETER STANDARDS
//*    FILE
//*
//*
//AQEMD10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//              PROG1=ASRSTND,
//              PROG2=AEMSTND,
//              OLDSTAN=AQOLDSTD,
//              NEWSTAN=AQNEWSTD,
//              UNIT=3330,
//              SERIAL=CDHSPK,
//              DISP='NEW,CATLG,DELETE',
//              SPCUNIT=TRK,
//              PRIMARY=10,
//              SECNDRY=5,
//              TEMP=SYSDA,
//              SORTSPC=10,
//              OUT=A
//*
//SORT     EXEC PGM=&PROG1,
//              TIME=(1,0)
//STEPLIB    DD DSNAME=&PROJECT..LOAD,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* SORT INCOMING TRANSACTIONS INTO FILE SEQUENCE
//*
//SORTLIB    DD DSNAME=SYS1.SORTLIB,
//              DISP=(SHR,PASS)
//*
//SYSOUT     DD SYSOUT=&OUT
//*
//SORTWK01   DD UNIT=&TEMP,
//              SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//SORTWK02   DD UNIT=(&TEMP,SEP=SORTWK01),
//              SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//SORTWK03   DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02)),
//              SPACE=(TRK,&SORTSPC,,CONTIG)
//*
//* INPUT DATA SET - PARAMETER STANDARDS FILE TRANSACTIONS
//*
//AQSINPUT   DD DDNAME=INPUT,
//              DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - SORTED TRANSACTIONS
//*
//AQSOUTPT   DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02,SORTWK03)),
//              DISP=(NEW,PASS,DELETE),
//              SPACE=(TRK,&SORTSPC,RLSE),
//              DSNAME=&&TRANS,
```

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Figure 4.4.2-e. Cataloged Procedure AQEMD10

```
//             DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                        00005900
//*                                                                     00006000
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00006100
//*                                                                     00006200
//AQSPRINT  DD SYSOUT=&OUT                                              00006300
//*                                                                     00006400
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006500
//*                                                                     00006600
//SYSPRINT  DD SYSOUT=&OUT                                              00006700
//*                                                                     00006800
//SYSOUT    DD SYSOUT=&OUT                                              00006900
//*                                                                     00007000
//SYSDBOUT  DD SYSOUT=&OUT                                              00007100
//*                                                                     00007200
//SYSDTERM  DD SYSOUT=&OUT                                              00007300
//*                                                                     00007400
//SYSUDUMP  DD SYSOUT=&OUT                                              00007500
//*                                                                     00007600
//*                                                                     00007700
//UPDATE  EXEC PGM=&PROG2,                                              00007800
//             REGION=60K,                                              00007900
//             TIME=(1,0)                                               00008000
//*                                                                     00008100
//* MAINTAIN PARAMETER STANDARDS FILE                                   00008200
//*                                                                     00008300
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00008400
//             VOLUME=(PRIVATE,RETAIN),                                 00008500
//             DISP=(SHR,PASS)                                          00008600
//          DD DSNAME=SYS1.COBLIB,                                      00008700
//             DISP=(SHR,PASS)                                          00008800
//*                                                                     00008900
//* INPUT DATA SET - SORTED TRANSACTIONS                                00009000
//*                                                                     00009100
//AQSCARDS  DD DSNAME=&&TRANS,                                          00009200
//             DISP=(OLD,DELETE)                                        00009300
//*                                                                     00009400
//* INPUT DATA SET - OLD PARAMETER STANDARDS FILE                       00009500
//*                                                                     00009600
//AQSOLDFL  DD DSNAME=&PROJECT..DATA.&OLDSTAN,                          00009700
//             VOLUME=(PRIVATE,RETAIN),                                 00009800
//             DISP=(SHR,PASS)                                          00009900
//*                                                                     00010000
//* OUTPUT DATA SET - NEW PARAMETER STANDARDS FILE                      00010100
//*                                                                     00010200
//AQSSTDFL  DD UNIT=&UNIT,                                              00010300
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),                     00010400
//             DISP=(&DISP),                                            00010500
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),               00010600
//             DSNAME=&PROJECT..DATA.&NEWSTAN                           00010700
//*                                                                     00010800
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00010900
//*                                                                     00011000
//AQSPRINT  DD SYSOUT=&OUT                                              00011100
//*                                                                     00011200
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00011300
//*                                                                     00011400
//SYSPRINT  DD SYSOUT=&OUT                                              00011500
//*                                                                     00011600
```

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Figure 4.4.2-e - continued. Cataloged Procedure AQEMD10

```
//SYSOUT    DD SYSOUT=&OUT                                                  00011700
//*                                                                         00011800
//SYSDBOUT  DD SYSOUT=&OUT                                                  00011900
//*                                                                         00012000
//SYSDTERM  DD SYSOUT=&OUT                                                  00012100
//*                                                                         00012200
//SYSUDUMP  DD SYSOUT=&OUT                                                  00012300
//*                                                                         00012400
```

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Figure 4.4.2-e - continued. Cataloged Procedure AQEMD10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087. CDHS.HQ.AQS.DATA.AQOLDSTD would be the old parameter standards file
PROG1	ASRSTND	Parameter standards file transaction sort program.
PROG2	AEMSTND	Name of the parameter data set. Parameter standards file maintenance program.
OLDMSTR	AQOLDSTD	Lowest-level index of old parameter standards file
NEWMSTR	AQNEWSTD	Lowest-level index of new (or updated) parameter standards file.
UNIT	3330	Unit type to which new (or updated) parameter standards file is to be written
SERIAL	CDHSPK	Volume serial number of the volume to which new (or updated) parameter standards file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of new parameter standards file

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Figure 4.4.2-f. Substitutable Parameters for AQEMD10

Parameter Name	Default Value	Description
SPCUNIT	TRK	Units in which space for new parameter standards file is to be allocated
PRIMARY	10	Primary space allocation for new (or updated) parameter standards file.
SECNDRY	5	Secondary space allocation for new (or updated) standards file.
TEMP	SYSDA	Unit type for temporary work space
SORTSPC	10	Number of tracks to be allocated for the sort work space
OUT	A	SYSOUT class for all print files

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Figure 4.4.2-f - Continued. Substitutable Parameters for AQEMD10

4.5 MASTER FILE

4.5.1 MASTER FILE TRANSACTION EDIT PROGRAM - AEDMSTR (AQ0060)

4.5.1.1 Description

The AQDHS-II master file is created and updated by AQDHS-II input transactions. These transactions can be either add, change, or delete transactions. The master file transaction edit program edits the input transactions and converts those that pass the edit criteria into internal transactions that can be input to the master file maintenance program AFMMSTR (AQ0100). There are three formats for the AQDHS-II input transactions: Form 1, Form 2, and Form 3. The Form 1 transactions are used to enter multiple readings taken at less than daily intervals for a single parameter at a given site. The Form 2 transactions are used to enter readings taken at daily or greater than daily intervals for multiple parameters; also, Form 2 transactions are used to enter composite data. The Form 3 transactions are used to enter readings taken at daily or greater than daily intervals for multiple sites. See Figure 4.5.1-a for an illustration of these various formats and Appendix D for examples of the load sheets.

The input transactions can be entered in any order as the editing of a transaction is done independently of other transactions. AEDMSTR (AQ0060) edits each field of each transaction for proper format and, where possible, proper content. See Figure 4.5.1-b for a description of the AQDHS-II transaction fields and their valid codes. Additionally, AEDMSTR (AQ0060) checks the parameter, method, and units codes of each transaction against the parameter file and rejects any that are not on that file. An analogous check is made for the site code group (state, area, site, agency, and project codes); the AQCR, county, and SLAMS/NAMS ID codes from the matching site file record are inserted in the transaction. Otner special edits include checking that negative readings are valid for the given parameter and comparing readings for certain parameters to established maximum values. See Appendix A Table 5 for a list of the valid negative parameters and Appendix A Table 6 for a list of maximun values for parameters.

Each input transaction is a physical record (card) containing one or more logical records (records containing common key information). A Form 1 transaction is a physical record containing one (1) logical record. A Form 2 transaction is a physical record containing from one (1) to four (4) logical records; i.e., there is one logical record for each parameter entry in a Form 2 transaction. A Form 3 transaction is a physical record with from one (1) to four (4) logical records; i.e., one (1) logical record for each site entry.

AEDMSTR (AQ0060) edits and rejects the logical record, not the physical record; i.e., one or several logical records on a physical record may fail the edit and be rejected even though the other logical records pass the edit and are converted to internal transactions. This method of rejecting only logical records insures the integrity of the master file while allowing the user to pass as many valid logical records as possible during one execution of AEDMSTR (AQ0060).

The logical record is rejected if any field is in error. If a common key field is in error, all logical records on the physical record will be rejected. Also, if the action code or action code/status flag combination is invalid, all logical records on that physical record will be rejected. By format type, the following rules apply:

Form 1: Form 1 transactions consist of one and only one logical record. That logical record is rejected if any field is in error.

Form 2: A logical record is rejected if the parameter, method, or units code, the decimal position, or the reading for that logical record is in error.

All logical records on the physical record (card) are rejected if a common key field is in error, or if either the action code or action code/status flag combination is invalid.

Form 3: A logical record is rejected if the start hour, site code group, or reading for that logical record is in error.

All logical records on the physical record (card) are rejected if a common key field is in error, or if either the action code or action code/status flag combination is invalid.

See Figure 4.5.1-b for a description of each field and its valid entries.

4.5.1.2 File Formats

AEDMSTR (AQ0060) uses four input files: the parameter file, the site file, the AQDHS-II transaction file, and an option card. See Sections 4.2.2.2 and 4.3.2.2 for the parameter and site code file formats. See Figure 4.5.1-a for the transaction formats and Figure 4.5.1-b for a description of the fields. The options are discussed in the following section.

AEDMSTR (AQ0060) produces a file containing internal transactions and a diagnostic report. The output internal transactions are in the format required for input to the file maintenance program but are not in the required sort order. The internal transaction sort program must be run on these transactions prior to running the file maintenance program (see Section 4.5.2 Master File Internal Transaction Sort Program). Figure 4.5.1-c illustrates the format of the internal transactions.

The diagnostic report consists of a listing of input transactions containing one or more logical records which failed the edit. An error message is printed with each transaction indicating both the invalid data and the field where it is contained. This listing does not contain those transactions which caused warning messages but did not fail the edit unless the user requests that listing via an option card. The diagnostic report also lists the update messages as well as summary statistics giving the options in effect, the number of input transactions, the number of output internal format transactions, and the number of errors detected. See Figure 4.5.1-d for an example of the diagnostic report.

AEDMSTR (AQ0060) also produces an optional listing of the input transactions which passed the edit. See Section 4.5.1.3 Options for a discussion of this listing and instructions for producing it, and Figure 4.5.1-e for an example of this listing.

4.5.1.3 Options

AEDMSTR (AQ0060) produces two optional listings: (1) a confirmation listing of input transactions which passed the edit, and (2) a listing of input transactions which contain questionable but not rejected data. To select one or both of these listings, the user must include an option card in the execution deck (see Section 4.5.1.5 Cataloged JCL). Figure 4.5.1-f illustrates the required format of the option card.

The LIST option produces the input transaction confirmation listing; i.e., a listing of those records which passed the edit. If this option is in effect, the entire physical record (transaction card) will be printed whenever at least one logical record on that card passes the edit. If any of the logical records failed the edit, the transaction card and error messages will also be printed in the diagnostic report. This listing of valid input transactions is an independent listing and is separate from the diagnostic report; the LIST option must be specified for it to be produced. If this option is not specified, its default, NOLIST, is in effect and the valid transaction listing will not be produced; however, the diagnostic report is always produced.

If the NOLIST option is specified, no listing of valid transactions will be produced. However, the diagnostic report listing all transactions which failed the edit will still be produced. Specifying the NOLIST option produces the same result as not specifying LIST.

The FLAGW option produces a listing of those transactions which contain logical records that are questionable but were not rejected. Such records produce warning messages indicating the questionable data and the field containing it. This listing is contained in the diagnostic report along with the listing of the rejected transactions whenever the FLAGW option is in effect. If FLAGW is not specified, its default, NOFLAGW, is in effect and this listing will not be produced. However, the rejected transactions will still be listed.

If the NOFLAGW option is specified, no listing of questionable transactions will be produced. However, the diagnostic report will still be produced. Specifying the NOFLAGW option produces the same result as not specifying FLAGW.

If no option card is included in the execution deck, or if an invalid option card is included, the default options NOLIST and NOFLAGW will be in effect.

4.5.1.4 Error Messages

AEDMSTR 001 ERROR - COLUMN 01 - INVALID TRANSACTION CODE - CARD REJECTED

Meaning: The only valid transaction codes are 1, 2, and 3.

Action: Correct and resubmit.

AEDMSTR 002 ERROR - COLUMN 01 - NON-NUMERIC TRANSACTION CODE - CARD REJECTED

Meaning: The only valid transaction codes are 1, 2, and 3.

Action: Correct and resubmit.

AEDMSTR 003 ERROR - COLUMN 80 - INVALID ACTION CODE - CARD REJECTED

Meaning: The only valid action codes are 1 (Delete), 2 (Add), and 3 (Change).

Action: Correct and resubmit.

AEDMSTR 004 ERROR - COLUMN 80 - NON-NUMERIC ACTION CODE - CARD REJECTED

Meaning: The only valid action codes are 1 (Delete), 2 (Add), and 3 (Change).

Action: Correct and resubmit.

AEDMSTR 005 ERROR - COLUMN xx - INVALID TIME CODE - CARD REJECTED

Meaning: The time code beginning in column xx is invalid. The valid time codes are shown in Appendix A, Table 3.

Action: Correct and resubmit.

AEDMSTR 006 ERROR - COLUMN 02 - NON-NUMERIC STATE CODE - CARD REJECTED

Action: Correct and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 007 ERROR - COLUMN 02 - INVALID STATE CODE - CARD REJECTED

Meaning: The state code is not in the site file.

Action: Correct the state code or update the site file and resubmit.

AEDMSTR 008 ERROR - COLUMN xx - NON-NUMERIC AREA CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 009 ERROR - COLUMN xx - NON-NUMERIC SITE CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 010 ERROR - COLUMN xx - NON-ALPHABETIC AGENCY CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 011 ERROR - COLUMN xx - NON-NUMERIC PROJECT CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 012 ERROR - COLUMN xx - NON-NUMERIC TIME CODE - CARD REJECTED

Meaning: The time code beginning in column xx is invalid. The valid time codes are shown in Appendix A, Table 3.

Action: Correct and resubmit.

AEDMSTR 013 ERROR - COLUMN xx - NON-NUMERIC YEAR - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 014 ERROR - COLUMN xx - YEAR LESS THAN SIXTY - CARD REJECTED

Meaning: SAROAD does not accept data prior to 1960.

---

xx - Column Number   yy - Group Number

AEDMSTR 015 ERROR - COLUMN xx - NON-NUMERIC MONTH - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 016 ERROR - COLUMN xx - MONTH ZERO OR GREATER THAN TWELVE - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 017 ERROR - COLUMN xx - NON-NUMERIC DAY - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 018 ERROR - COLUMN xx - INVALID DAY - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 019 ERROR - COLUMN xx - NON-NUMERIC START HOUR - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 020 ERROR - COLUMN xx - DECIMAL POSITION GREATER THAN FOUR - CARD REJECTED
Meaning: AQDHS-II currently will not accept a decimal position greater than four.
Action: Change units, data value, and decimal code to accomodate the new decimal and resubmit.

AEDMSTR 021 ERROR - COLUMN xx - NON-NUMERIC PARAMETER CODE - CARD REJECTED
Action: Correct and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 022 ERROR - COLUMN xx - NON-NUMERIC METHOD CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 023 ERROR - COLUMN xx - NON-NUMERIC UNITS CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 024 ERROR - COLUMN xx - NON-NUMERIC DECIMAL POSITION - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 025 ERROR - COLUMN 21 - START HOUR INVALID FOR TIME CODE - CARD REJECTED

Meaning: See Appendix A, Table 3 for valid time codes versus start hour.

Action: Correct and resubmit.

AEDMSTR 026 WARNING - COLUMN xx - START HOUR GREATER THAN TWENTY-THREE - CARD ACCEPTED

Meaning: An erroneous start hour has been coded; however, this will not affect the operation of the programs or the file sequence (for Form 2 and 3 data only).

Action: No action required.

AEDMSTR 027 ERROR - COLUMN xx - NON-NUMERIC READING - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 028 ERROR - RECORD CONTAINS NO READINGS - CARD REJECTED

Meaning: The transaction contains no readings for Form 1 data or no key information and readings for Form 2 and Form 3 data.

Action: Correct and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 029 ERROR - COLUMN 19 - NON-NUMERIC NUMBER OF SAMPLES - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 030 ERROR - COLUMN 22 - INVALID COMPOSITE TIME CODE - CARD REJECTED
Meaning: The only valid composite time codes are 1-9, A, and B.
Action: Correct and resubmit.

AEDMSTR 031 ERROR - COLUMN 21 - NON-NUMERIC COMPOSITE TYPE - CARD REJECTED
Meaning: The only valid composite type codes are 1 (Quarterly), 2 (Seasonal), 3 (Monthly), 4 (Weekly), and 5 (Annual).
Action: Correct and resubmit.

AEDMSTR 032 ERROR - COLUMN 17 - NON-NUMERIC PERIOD - CARD REJECTED
Meaning: The composite period field contains non-numeric data.
Action: Correct and resubmit.

AEDMSTR 033 ERROR - COLUMN 17 - INVALID PERIOD - CARD REJECTED
Meaning: The composite period field contains invalid data; see Section 4.5.1.2, Figure 4.5.1-b for the valid codes.
Action: Correct and resubmit.

AEDMSTR 034 ERROR - COLUMN 21 - INVALID COMPOSITE TYPE - CARD REJECTED
Meaning: See Section 4.5.1.2, Figure 4.5.1-b for the valid codes.
Action: Correct and resubmit.

AEDMSTR 035 ERROR - COLUMN xx - INVALID AREA CODE - CARD REJECTED
Meaning: The area code specified is not in the site file.
Action: Correct the area code or update the site file and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 036 ERROR - COLUMN xx - INVALID SITE CODE - CARD REJECTED

Meaning: The site code specified is not in the site file.

Action: Correct the site code or update the site file and resubmit.

AEDMSTR 037 ERROR - COLUMN xx - INVALID AGENCY CODE - CARD REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 038 ERROR - COLUMN xx - INVALID PROJECT CODE - CARD REJECTED

Meaning: The project code specified is not in the site file.

Action: Correct the project code or update the site file and resubmit.

AEDMSTR 039 ERROR - COLUMN xx - INVALID PARAMETER CODE - CARD REJECTED

Meaning: The parameter code specified is not in the parameter file.

Action: Correct the parameter code or update the parameter file and resubmit.

AEDMSTR 040 ERROR - COLUMN xx - INVALID METHOD CODE - CARD REJECTED

Meaning: The method code specified is not in the parameter file.

Action: Correct the method code or update the parameter file and resubmit.

AEDMSTR 041 ERROR - COLUMN xx - INVALID UNITS CODE - CARD REJECTED

Meaning: The units code specified is not in the parameter file.

Action: Correct the units code or update the parameter file and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 042 CONDITIONAL - COLUMN xx - READING EXCEEDS MAXIMUM PERMITTED

Meaning: The reading exceeds the SAROAD maximum value allowed for the parameter. However, the data is accepted.

Action: If this value is correct, notify EPA, in writing, when you submit your data that you have already verified the reading and that it should be included in SAROAD.

AEDMSTR 043 CONDITIONAL - COLUMN xx - READING EXCEEDS MAXIMUM PERMITTED

Meaning: The reading exceeds the SAROAD maximum value allowed for the parameter. However, the data is accepted.

Action: If this value is correct, notify EPA, in writing, when you submit your data that you have already verified the reading and that it should be included in SAROAD.

AEDMSTR 044 ERROR - COLUMN 79 - INVALID STATUS FLAG - CARD REJECTED

Meaning: Blank and S are the only valid transaction status flag values. Moreover, S is only valid for add transactions.

Action: Correct and resubmit.

AEDMSTR 045 ERROR - COLUMN xx - INVALID START HOUR (READINGS SPAN END OF DAY) - REJECTED

Meaning: See Appendix A, Table 3 for valid start hours.

Action: Correct and resubmit.

AEDMSTR 046 CONDITIONAL - MISSING OR INVALID OPTION CARD - DEFAULT OPTIONS USED

Meaning: An invalid option or no option has been specified. The program was executed using the default options NOLIST and NOFLAGW.

---

xx - Column Number   yy - Group Number

AEDMSTR 047 ERROR - COLUMN xx - INVALID AREA CODE - GROUP yy REJECTED

Meaning: The area code specified is not in the site file.

Action: Correct the area code or update the site file and resubmit.

AEDMSTR 048 ERROR - COLUMN xx - INVALID SITE CODE - GROUP yy REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 049 ERROR - COLUMN xx - INVALID AGENCY CODE - GROUP yy REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 050 ERROR - COLUMN xx - INVALID PROJECT CODE - GROUP yy REJECTED

Meaning: The project code specified is not in the site file.

Action: Correct the project code or update the site file and resubmit.

AEDMSTR 051 ERROR - COLUMN xx - INVALID PARAMETER CODE - GROUP yy REJECTED

Meaning: The parameter code specified is not in the parameter file.

Action: Correct the parameter code or update the parameter file and resubmit.

AEDMSTR 052 ERROR - COLUMN xx - INVALID METHOD CODE - GROUP yy REJECTED

Meaning: The method code specified is not in the parameter file.

Action: Correct the method code or update the parameter file and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 053 ERROR - COLUMN xx - INVALID UNITS CODE - GROUP yy REJECTED

Meaning: The units code specified is not in the parameter file.

Action: Correct the units code or update the parameter file and resubmit.

AEDMSTR 054 ERROR - COLUMN xx - DECIMAL POSITION GREATER THAN FOUR - GROUP yy REJECTED

Meaning: AQDHS-II currently will not accept a decimal position greater than four.

Action: Change units, data value, and decimal code to accomodate the new decimal and resubmit.

AEDMSTR 055 ERROR - COLUMN xx - NON-NUMERIC DECIMAL POSITION - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 056 ERROR - COLUMN xx - NON-NUMERIC AREA CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 057 ERROR - COLUMN xx - NON-NUMERIC SITE CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 058 ERROR - COLUMN xx - NON-NUMERIC PARAMETER CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 059 ERROR - COLUMN xx - NON-NUMERIC METHOD CODE - GROUP yy REJECTED

Action: Correct and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 060 ERROR - COLUMN xx - NON-NUMERIC UNIT CODE - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 061 ERROR - COLUMN xx - NON-NUMERIC READING - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 062 ERROR - COLUMN xx - NON-NUMERIC START HOUR - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 063 ERROR - COLUMN xx - INVALID NEGATIVE DATA FORMAT - GROUP yy REJECTED
Meaning: Negative data must adhere to the following format: -ddd where d is any digit 0-9.
Action: Correct and resubmit.

AEDMSTR 064 ERROR - COLUMN xx - DATA MUST BE POSITIVE FOR THIS PARM - GROUP yy REJECTED
Meaning: Check the parameter code and the reading for consistency (see Appendix A, Table 5 for valid negative parameters).
Action: Correct and resubmit.

AEDMSTR 065 ERROR - COLUMN xx - INVALID NEGATIVE DATA FORMAT - CARD REJECTED
Meaning: Negative data must adhere to the following format: -ddd where d is any digit 0-9.
Action: Correct and resubmit.

---

xx - Column Number   yy - Group Number

AEDMSTR 066 ERROR - COLUMN xx - DATA MUST BE POSITIVE FOR THIS PARM - CARD REJECTED

Meaning: Check the parameter code and the reading for consistency (see Appendix A, Table 5 for valid negative parameters).

Action: Correct and resubmit.

AEDMSTR 067 ABORT - NUMBER OF PARAMETER FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: The parameter file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the parameter file.

AEDMSTR 068 ABORT - PARM-CODE-KEY-ARRAY AREA OVERFLOW

Meaning: The parameter file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size

AEDMSTR 069 ABORT - NUMBER OF SITE FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: The site file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the site file.

AEDMSTR 070 ABORT - SITE-CODE-ARAY AREA OVERFLOW

Meaning: The site file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the site file.

---

xx - Column Number   yy - Group Number

4.5.1.5 Cataloged JCL

4.5.1.5.1 JCL listing - AEDMSTR (AQ0060) can be run by executing the cataloged procedure AQEDT10. See Figure 4.5.1-g for a listing of AQEDT10.

4.5.1.5.2 Cross-reference of DD names and files

Program Name: AEDMSTR (AQ0060):

DD Name	File Description	Input/Output
AQSTRANS	AQDHS-II input transactions	Input
AQSPARMS	Parameter file	Input
AQSSITES	Site file	Input
AQSOPTIN	Option card	Input
AQSINTRN	Edited internal transactions	Output
AQSCONFR	Input transaction confirmation listing	Output
AQSPRINT	Diagnostic report	Output

4.5.1.5.3 User-supplied JCL - To execute the cataloged procedure AQEDT10, the user must specify the data set names of the parameter, site, and internal transaction files. An option card may be included if any of the listing options are desired. See Figure 4.5.1-h for a description of the procedure's substitutable parameters.

4.5.1.5.4 Sample run stream - The following run stream would edit input transactions contained on cards and list the warning messages. The data set names of the parameter, site, and internal transaction files are their respective default values.

```
// EXEC AQEDT10,
//EDIT.OPTIONS DD *
NOLIST FLAGW
```

```
/*
//EDIT.INPUT DD *
Transaction cards
/*
```

4.5.1.6 Warnings and Special Instructions

Any parameter, method, and units code combination coded on an input transaction must exist on the input parameter file for that transaction to pass the the edit. Likewise, any state, area, site, agency, and project combination must exist on the input site file.

As released by NADB, AEDMSTR (AQ0060) will not accept parameter or site files containing more than 200 records. If either of these input files contains more than 200 records, the program will abort before any transactions are edited. If you require larger files, see Appendix C for the modifications which must be made to your source module for AEDMSTR (AQ0060). After the required changes are made to the source module, AEDMSTR (AQ0060) must be recompiled and link edited using the cataloged procedure AQCLC10 (see Section 8.2.4.1). Also, note that every program which uses either the parameter or the site file will be affected by the increase in size. See Sections 4.2.2. and 4.3.2 for a list of those programs.

4.5.1.7 Cost Considerations

To reduce the cost of running AEDMSTR (AQ0060), use the default options NOLIST and NOFLAGW unless you actually need one or both of the optional listings.

The estimates listed below are based on the execution of the run stream discussed in Section 4.5.1.5.4 on an IBM 370/168.

Number of input transactions:	26 transactions
Number of output internal transactions:	26 transactions
Number of errors detected:	8 errors
CPU time:	.4 second
I/O time:	5.1 seconds
Total time:	5.5 seconds
Estimated cost:	$1.59

4.5.1.8 Related Programs and Procedures

The cataloged procedure AQEMM10 may be executed to edit and convert AQDHS-II input transactions, sort the resultant internal transactions, and update the master file. See Section 4.6.1 Master File Edit-Maintenance for a complete description of this procedure.

AQDHS-II Transaction - Form 1 (Less-than-Daily Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Numeric	State Code
4 - 7	4	Numeric	Area Code
8 - 10	3	Numeric	Site Code
11	1	Alphabetic	Agency Code
12 - 13	2	Numeric	Project Code
14	1	Numeric	Time Code
15 - 16	2	Numeric	Year
17 - 18	2	Numeric	Month
19 - 20	2	Numeric	Day
21 - 22	2	Numeric	Start Hour
23 - 27	5	Numeric	Parameter Code
28 - 29	2	Numeric	Method Code
30 - 31	2	Numeric	Units Code
32	1	Numeric	Decimal Code
33 - 36	4	Numeric	Reading
37 - 40	4	Numeric	Reading
41 - 44	4	Numeric	Reading
45 - 48	4	Numeric	Reading
49 - 52	4	Numeric	Reading
53 - 56	4	Numeric	Reading
57 - 60	4	Numeric	Reading
61 - 64	4	Numeric	Reading
65 - 78	14	Numeric	Unused
79	1	Alphabetic	Transaction Status Flag
80	1	Numeric	Action Code

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Figure 4.5.1-a. Transaction Formats

AQDHS-II Transaction - Form 2 (Daily or Greater-than-Daily Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Numeric	State Code
4 - 7	4	Numeric	Area Code
8 - 10	3	Numeric	Site Code
11	1	Alphabetic	Agency Code
12 - 13	2	Numeric	Project Code
14	1	Alphanumeric	Time Code
15 - 16	2	Numeric	Year
17 - 18	2	Numeric	Month
19 - 20	2	Numeric	Day
21 - 22	2	Numeric	Start Hour
23 - 27	5	Numeric	Parameter Code
28 - 29	2	Numeric	Method Code
30 - 31	2	Numeric	Units Code
32	1	Numeric	Decimal Code
33 - 36	4	Numeric	Reading
37 - 50	14		Repeat Columns 23-36
51 - 64	14		Repeat Columns 23-36
65 - 78	14		Repeat Columns 23-36
79	1	Alphabetic	Transaction Status Flag
80	1	Numeric	Action Code

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Figure 4.5.1-a - Continued. Transaction Formats

AQDHS-II Transaction - Form 2 Composite Data

Column #	Field Length	Data Type	Description
1 - 16	16		Same as Form 2
17 - 18	2	Numeric	Composite Period
19 - 20	2	Numeric	Composite Number of Samples
21	1	Numeric	Composite Type
22	1	Alphanumeric	Composite Time Code*
23 - 80	58		Same as Form 2

---

*Use SAROAD time code (Appendix A, Table 3 instead of AQDHS-II time code.

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Figure 4.5.1-a - Continued. Transaction Formats

AQDHS-II Transaction - Form 3
(Multiple Site for Daily or Greater-than-Daily Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Numeric	State Code
4	1	Alphabetic	Agency Code
5 - 6	2	Numeric	Project Code
7	1	Alphanumeric	Time Code
8 - 12	5	Numeric	Parameter Code
13 - 14	2	Numeric	Method Code
15 - 16	2	Numeric	Units Code
17	1	Numeric	Decimal Code
18 - 19	2	Numeric	Year
20 - 21	2	Numeric	Month
22 - 23	2	Numeric	Day
24 - 25	2	Numeric	Start Hour
26 - 29	4	Numeric	Area Code
30 - 32	3	Numeric	Site Code
33 - 36	4	Numeric	Reading
37 - 49	13		Repeat Columns 24-36
50 - 62	13		Repeat Columns 24-36
63 - 75	13		Repeat Columns 24-36
76 - 78	3		Unused
79	1	Alphabetic	Transaction Status Flag
80	1	Numeric	Action Code

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Figure 4.5.1-a - Continued. Transaction Formats

Action Code: Indicates whether the transaction is an add, change, or delete.

Valid Codes: 1 - Delete
2 - Add
3 - Change

Field Length: 1 character

Agency Code: Identifies the agency responsible for the sampling site.

Valid Codes: See Appendix A, Table 1. Also, the code must be on the site file.

Field Length: 1 character

AQCR Code (internal transactions only): Identifies the AQCR (Air Quality Control Region) in which the sampling site is located.

Valid Codes: 001-247

Field Length: 3 characters

Area Code: Identifies the area in which the sampling site is located.

Valid Codes: The code must be on the site file.

Field Length: 4 characters

Composite Number of Samples: Indicates the number of individual samples that were composited.

Field Length: 2 characters

Composite Period: Identifies the period during which the composite sample was taken.

Valid Codes: 01 - 04 Quarterly and Seasonal Composite

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Figure 4.5.1-b. Definition of AQDHS-II Master File Transaction Fields

01 - 12	Monthly Composite
01 - 52	Weekly Composite
00	Annual Composite

Field Length: 2 characters

Composite Time Code: Indicates the interval at which the individual composited samples were taken.

Valid Codes: This time code should be taken from the SAROAD time codes in Appendix A, Table 3. The only valid composite time codes are 1-9, A, and B.

Field Length: 1 character

Composite Type: Indicates the interval for which the samples were composited.

Valid Codes:
1 - Quarterly Composite
2 - Seasonal Composite
3 - Monthly Composite
4 - Weekly Composite
5 - Annual Composite

Field Length: 1 character

County Code (internal transactions only): Identifies the county in which the sampling site is located.

Valid Codes: The code must be numeric.

Field Length: 4 characters

Day: The day of the month on which the sample was taken.

Field Length: 2 characters

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Figure 4.5.1-b - Continued. Definition of AQDHS-II Master File Transaction Fields

Decimal Code: Indicates the number of digits in the reading that are to fall to the right of the decimal point. For example, a reading of 123.5 would have a decimal code of 1.

Valid Codes: 0-4
Field Length: 1 character

Form Code: Indicates which transaction format is being used.

Valid Codes: 1 - Form 1
2 - Form 2
3 - Form 3
Field Length: 1 character

Method Code: Identifies both the collection method and the analysis method for the parameter being measured.

Valid Codes: The code must be on the parameter file.
Field Length: 2 characters

Month: The month of the year during which the sample was taken.

Field Length: 2 characters

Number of Readings (internal transactions only): The number of readings contained in the transaction.

Valid Codes: 1-8
Field Length: 2 characters

Parameter Code: Identifies the parameter being measured.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a full list of currently accepted parameter codes. Also, the code must be on the parameter file.

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Figure 4.5.1-b - Continued. Definition of AQDHS-II Master File Transaction Fields

Field Length: 5 characters

Project Code: Identifies the project in association with which the sample was taken.
Valid Codes: See Appendix A, Table 2. Also, the code must be on the site file.
Field Length: 2 characters

Reading: The value of the sample taken.
Valid Codes: This field can contain either positive or negative data; however, either type must be right-justified within the field. Also, if the reading is negative, it must adhere to the following format: -ddd where d is any digit 0-9. See Appendix A, Table 5 for a list of parameters which may have negative readings.
Field Length: 4 characters

Site Code: Identifies the site at which the sample was taken.
Valid Codes: The code must be on the site file.
Field Length: 3 characters

SLAMS/NAMS ID (internal transactions only): Indicates whether the sampling site is a State and Local Air Monitoring Station (SLAMS) or a National Air Monitoring Station (NAMS).
Valid Codes: The code must be alphabetic.
Field Length: 1 character

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Figure 4.5.1-b - Continued. Definition of AQDHS-II Master File Transaction Fields

Start Hour: On Form 1 transactions, the hour at which the first reading was taken. On Form 2 and Form 3 transactions, the hour at which the sample was taken.
Valid Codes: See Appendix A, Table 3.
Field Length: 2 characters

State: Indicates the state (or other geographic division) in which the sampling site is located.
Valid Codes: The code must be on the site file.
Field Length: 2 characters

Time Code: Indicates the interval at which the samples were taken.
Valid Codes: See Appendix A, Table 3.
Field Length: 1 character

Transaction Status Flag: Indicates the status of the readings on the transaction.
Valid Codes: S — Previously sent to SAROAD
Note: S can only be used on add transactions.
blank — To be sent to SAROAD
Field Length: 1 character

Units Code: Indicates the units in which the parameter was measured.
Valid Codes: See Appendix A, Table 4 for a partial list. Also, the code must be on the parameter file.
Field Length: 2 characters

Year: The year in which the sample was taken.
Valid Codes: The year must be greater than or equal to 60.
Field Length: 2 characters

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Figure 4.5.1-b - Continued. Definition of AQDHS-II Master File Transaction Fields

Record Position	Field Length	Description		
1	1	Action Code		
2	1	Form Code		
3	1	Transaction Status Flag		
4 - 8	5	Reserved Area		
9 - 10	2	State Code	Sort Key 1	Sequence Key
11 - 13	3	AQCR Code		
14 - 17	4	County Code		
18 - 21	4	Area Code		
22 - 24	3	Site Code		
25	1	Agency Code		
26 - 27	2	Project Code		
28	1	Time Code		
29 - 30	2	Year		
31 - 35	5	Parameter Code	Sort Key 2	
36 - 37	2	Method Code		
38 - 39	2	Units Code		
40 - 41	2	Month	Sort Key 3	
42 - 43	2	Day		
44 - 45	2	Start Hour		
46	1	SLAMS/NAMS ID		
47 - 56	10	Reserved Area		
57	1	Decimal Code		
58 - 59	2	Number of Readings		
60 - 63	4	Reading - Can be repeated up to 8 times		

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Figure 4.5.1-c. AQDHS-II Internal Transaction Format

Record Position	Field Length	Description		
1	1	Action Code		
2	1	Form Code		
3	1	Transaction Status Flag		
4 - 8	5	Reserved Area		
9 - 10	2	State Code	Sort Key 1	Sequence Key
11 - 13	3	AQCR Code		
14 - 17	4	County Code		
18 - 21	4	Area Code		
22 - 24	3	Site Code		
25	1	Agency Code		
26 - 27	2	Project Code		
28	1	Time Code		
29 - 30	2	Year		
31 - 35	5	Parameter Code	Sort Key 2	
36 - 37	2	Method Code		
38 - 39	2	Units Code		
40	1	Composite Type	Sort Key 3	
41	1	Composite Time Code		
42 - 43	2	Composite Period		
44 - 45	2	Composite Number of Samples		
46	1	SLAMS/NAMS ID		
47 - 56	10	Reserved Area		
57	1	Decimal Code		
58 - 59	2	Number of Readings		
60 - 63	4	Reading - Can be repeated up to 8 times		

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Figure 4.5.1-c. AQDHS-II Internal Transaction Format - Composite Data

```
                    AQDHS-II MASTER FILE TRANSACTION EDIT PROGRAM  -  DIAGNOSTIC REPORT                PAGE    1

PROGRAM NAME: AEDMSTR (AQ0060)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

OPTIONS IN EFFECT: LIST   NOFLAGW


INPUT TRANSACTIONS              ERRORS

13400030106041750822166110123121000200020003000400030002000030002              2
        *** AEDMSTR 041 ERROR - COLUMN 30 - INVALID UNITS CODE - CARD REJECTED


NUMBER OF TRANSACTIONS READ:                           12
NUMBER OF TRANSACTIONS PASSING EDIT CRITERIA:          11
NUMBER OF INTERNAL TRANSACTIONS CREATED:               11
NUMBER OF WARNING MESSAGES:                             0
NUMBER OF CONDITIONAL MESSAGES:                         0
NUMBER OF ERROR MESSAGES:                               1
NUMBER OF ABORT MESSAGES:                               0
```

Figure 4.5.1-d. Diagnostic Report

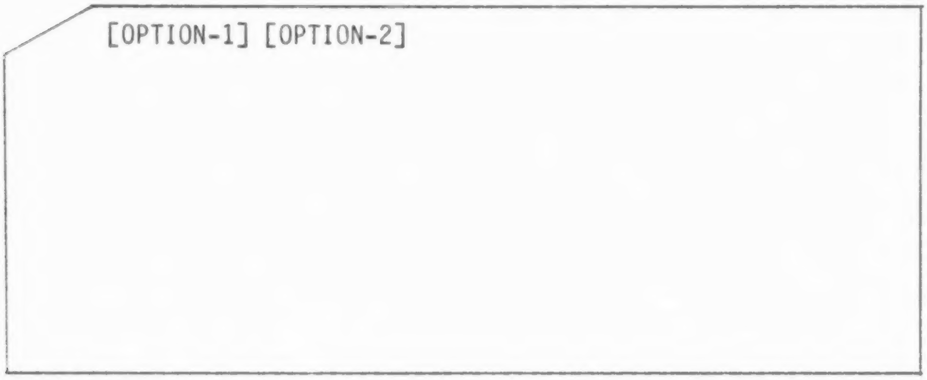
```
                    AQDHS-II MASTER FILE TRANSACTION EDIT PROGRAM  -  CONFIRMATION LISTING                  PAGE    1

INPUT TRANSACTIONS PASSING EDIT CRITERIA

1120001003C01174061000611022114000010002000400030002000300020001               2
1120001003C01174061008611022114000020001000300000002000400020004               2
1120001003C01174061016611022114000050003000200010002000200030004               2
1120001003C01173091200611025014000050006000400030003000200050003               2
1120001003C01173091208611025014000030004000300040003000300030002               2
1120001003C01173091216611025014000030002000400030003000200040003               2
1373000997A0526301010062101201519000091009200                                  3
1373000997A0526301020062101201509000091009200                                  3
1373000997A0526301030062101201539000091009200                                  3
1373000997A0526301040062101201529000091009200                                  3
1373000997A0526301050062101201529000091009200                                  3

NUMBER OF TRANSACTIONS PASSING EDIT CRITERIA:        11
```

Figure 4.5.1-e. Optional Listing



```
[OPTION-1] [OPTION-2]
```

The options can appear in any order and in any position on the card subject to the following rules:

1. There can be only one card.

2. All options must be punched within columns 1 through 72, inclusive.

3. There must be at least one space between the options if both are specified. A comma may be used as a separator rather than a space, and a space may precede and/or follow the comma.

Figure 4.5.1-f. Option Card Format

```
//*
//*    PROCEDURE NAME: AQEDT10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO EDIT AQDHS-II TRANSACTIONS AND
//*    CATALOGUE THE EDITED TRANSACTIONS
//*
//*
//AQEDT10 PROC PROJECT='CN.EPALMH.A087.CDHS,HQ,AQS',
//             PROGRAM=AEDMSTR,
//             TIME1='3,0',
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=10,
//             SECNDRY=5,
//             TRANS=EDITTRAN,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             OUT=A
//*
//EDIT    EXEC PGM=&PROGRAM,
//             REGION=150K,
//             TIME=(&TIME1)
//*
//* EDIT AQDHS-II MASTER FILE TRANSACTIONS
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - EDIT OPTIONS CONTROL CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - AQDHS-II MASTER FILE TRANSACTIONS
//*
//AQSTRANS  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - PARAMETER FILE
//*
//AQSPARMC  DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - SITE FILE
//*
//AQSSITES  DD DSNAME=&PROJECT..DATA.&SITEFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
```

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Figure 4.5.1-g. Cataloged Procedure AQEDT10

```
//* OUTPUT DATA SET - AQDHS-II INTERNAL TRANSACTIONS
//*
//AQSINTRN  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&TRANS,
//             DCB=(RECFM=FB,LRECL=68,BLKSIZE=1632)
//*
//* OUTPUT DATA SET - TRANSACTION LISTING
//*
//AQSCONFR  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

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Figure 4.5.1-g - continued. Cataloged Procedure AQEDT10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQPARMFL would be the full data set name of the parameter file)
PROGRAM	AEDMSTR	Master file transaction edit program
TIME1	'3,0'	Time allocated for execution of AEDMSTR
UNIT	3330	Unit type to which edited internal transactions are to be written
SERIAL	CDHSPK	Volume identification to which edited internal transactions are to be written
DISP	'NEW,CATLG, DELETE'	Disposition of edited internal transactions
SPCUNIT	TRK	Units in which space for edited internal transactions is to be allocated
PRIMARY	10	Primary space allocation for edited internal transactions
SECNDRY	5	Secondary space allocation for edited internal transactions
TRANS	EDITTRAN	Lowest-level index of data set to contain edited internal transactions
PARMFIL	AQPARMFL	Lowest-level index of parameter file
SITEFIL	AQSITEFL	Lowest-level index of site file
OUT	A	SYSOUT class for all print files

Figure 4.5.1-h. Substitutable Parameters for AQEDT10

4.5.2 MASTER FILE INTERNAL TRANSACTION SORT PROGRAM - ASRINTR (AQ0130)

4.5.2.1 Description

ASRINTR (AQ0130) sorts master file internal transactions into the sequence required by the master file maintenance program AFMMSTR (AQ0100); Figure 4.5.2-a details this sort order. All master file internal transactions must be sorted by ASRINTR (AQ0130) before they can be used to update (or create) the master file. See Section 4.5.1 for additional information on the internal transactions.

4.5.2.2 File Formats

Input to this program consists solely of master file internal transactions generated by AEDMSTR (AQ0060), the master file transaction edit program. Refer to Section 4.5.1.2 for a description of the internal transaction format.

ASRINTR (AQ0130) produces two output files: a temporary file containing the sorted internal transactions and a diagnostic report. The transactions are in the same sequence as the master file and can be used as input to the master file maintenance program AFMMSTR (AQ0100). An example of the diagnostic report is shown in Figure 4.5.2-b.

4.5.2.3 Options

There are no options.

4.5.2.4 Error Messages

There are no error messages.

4.5.2.5 Cataloged JCL

ASRINTR (AQ0130) should always be executed in conjunction with the master file maintenance program AFMMSTR (AQ0100). See Section 4.5.3.5 for a discussion of the cataloged procedure AQFMM10, which executes both programs.

4.5.2.6 Warnings and Special Instructions

Note that the COBOL sort verb is used in this program; therefore, the collating sequence for alphanumeric fields is determined by the computer at the user's particular installation.

In addition to the diagnostic report produced by ASRINTR (AQ0130), messages generated by the sort-merge package will be printed. The format and content, as well as the physical location, of these messages depends upon the user's particular installation.

4.5.2.7 Cost Considerations

The following estimates are for the execution of ASRINTR (AQ0130) on an IBM 370/168:

Number of internal transactions:	69 transactions
CPU time:	.5 seconds
I/O time:	6.8 seconds
Total time:	7.3 seconds
Estimated cost:	$1.16

4.5.2.8 Related Programs and Procedures

ASRINTR (AQ0130) should always be executed in conjunction with the master file maintenance program AFMMSTR (AQ0100). The cataloged procedure AQFMM10 will execute both programs.

Also, ASRINTR (AQ0130) and AFMMSTR (AQ0100) may be executed in conjunction with the master file transaction edit program, AEDMSTR (AQ0060), by the cataloged procedure AQEMM10. See Section 4.6.1 for a discussion of this procedure.

Record Position	Description	Sort Sequence
9 - 10	State	Ascending
11 - 13	AQCR	Ascending
14 - 17	County	Ascending
18 - 21	Area	Ascending
22 - 24	Site	Ascending
25	Agency	Ascending
26 - 27	Project	Ascending
28	Time Code	Ascending
29 - 30	Year	Ascending
31 - 35	Parameter Code	Ascending
36 - 37	Method Code	Ascending
38 - 39	Unit Code	Ascending
40 - 41	Month	Ascending
42 - 43	Day	Ascending
44 - 45	Start Hour	Ascending
1	Action Code	Ascending
2	Form Code	Ascending
3	Status Flag	Ascending

Figure 4.5.2-a. Sort Sequence for Master File Internal Transactions

```
                 AQDHS-II MASTER FILE INTERNAL TRANSACTION SORT PROGRAM  -  DIAGNOSTIC REPORT                    PAGE  1
PROGRAM NAME: ASRINTR (AQ0130)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978


NUMBER OF INPUT INTERNAL TRANSACTIONS:          11
NUMBER OF OUTPUT INTERNAL TRANSACTIONS:         11
```

Figure 4.5.2-b. Diagnostic Report

4.5.3 MASTER FILE MAINTENANCE PROGRAM - AFMMSTR (AQ0100)

4.5.3.1 Description

The master file maintenance program is used to create and/or update the AQDHS-II master file. Internal format transactions produced by the master file transaction edit program are used as input to the file maintenance program to accomplish these functions. These internal transactions must be sorted into master file sequence before they are input into the file maintenance program (see Section 4.5.2 Master File Internal Transaction Sort Program).

Each internal transaction either adds data to, replaces (changes) data in, or deletes records from the master file. Any combination of transactions may be entered in one execution of the file maintenance program.

When a master file record is created and all readings are not supplied, all blank fields up to the last supplied reading are filled with nines to indicate a null reading. These null fields may then be updated by either an add or change transaction. (One cannot change a non-existing reading or add a reading to an existing reading.)

If a record contains one or more readings which have not been submitted to SAROAD, that record's submission status flag is N or V. It is N if one or more non-null readings have not undergone anomaly screening, V if all non-null readings have undergone anomaly screening. If all readings in a record have been submitted to SAROAD, that record's submission status flag is S or T. It is S if one or more non-null readings have not undergone anomaly screening, T if all non-null readings have undergone anomaly screening.

4.5.3.2 File Formats

AFMMSTR (AQ0100) uses two input files: the current AQDHS-II master file and the file of internal transactions produced by AEDMSTR (AQ0060). However, if AFMMSTR (AQ0100) is being executed to create a new AQDHS-II master file rather than update a current one, there is no input master file. See Figure 4.5.3-a for the format of the master file and Section 4.5.1.2, Figure 4.5.1-c for the format of the internal transactions. Note that the internal transactions must be sorted into master file sequence before they are input into AFMMSTR (AQ0100).

AFMMSTR (AQ0100) produces a new (or updated) master file and a diagnostic report. The master file consists of records designed to contain all data related to a particular parameter collected at a specific site. Each record contains from 1 to 31 readings representing a certain logical period of time, with the length of the period and the number of readings determined by the interval at which the samples were taken. For any sampling interval less than 24 hours, the record contains one day's readings (1-24 readings); for daily sampling intervals, the record contains one month's readings (1-31 readings); for weekly sampling intervals, the record contains one week's readings (1 reading); for monthly and quarterly sampling intervals, the record contains a year's readings (1-12 and 1-4 readings, respectively); for composite data, the record contains one reading. All records have the same format but are variable in length, since the length is determined by the number of readings actually stored in the record and not the maximum number possible. For example, a record for an hourly interval could hold a maximum of 24 readings: if readings 1, 3, and 6 were supplied when the record was created, the record would be six readings long (readings 2, 4, and 5 would be filled with nines to indicate null values).

The format of the master file record is illustrated in Figure 4.5.3-a. The individual fields are the same as those described for the master file transactions in Section 4.5.1.1, Figure 4.5.1-b, with the following exceptions: the action code field of the master file record indicates the last action (add or change) performed on that record, the record submission status flag indicates if any or all of the readings in the record have been submitted to SAROAD and screened for anomalies, and the number of readings indicates the number of readings contained in the record. The reserved areas in the master file (see Figure 4.5.3-a) contain no data but allow for future expansion of the master file record.

The diagnostic report contains the program update messages, option messages, diagnostic messages, and summary statistics. It also prints a table of the print characters used to represent the signed readings; however, since the representation of signed data is machine-dependent, these characters are not the same for all installations. A diagnostic message concerning a particular internal transaction is printed along with that transaction. Section 4.5.3.4 lists and explains the diagnostic messages produced by AFMMSTR. The report does not list warning messages (and the transactions causing them) unless the user requests that listing via an option card. See Figure 4.5.3-g for an example of the diagnostic report.

AFMMSTR (AQ0100) also produces optional confirmation listings of internal transactions, the records on the old master file which were affected by AFMMSTR (AQ0100), and the records on the new (or updated) master file which were affected by AFMMSTR (AQ0100). See Section 4.5.3.3 for a discussion of these listings and instructions for producing them, and Figure 4.5.3-b for examples of these listings.

4.5.3.3 Options

There are four optional confirmation listings which can be produced by AFMMSTR (AQ0100): (1) a listing of warning messages, (2) a listing of the valid internal transactions, (3) a listing of the records on the old master file which were affected by AFMMSTR (AQ0100), and (4) a listing of the records on the new (or updated) master file which were affected by AFMMSTR (AQ0100). To select one or all of these listings, include an option card in the execution deck (see Section 4.5.3.5 Cataloged JCL). Figure 4.5.3-c illustrates the required format of the option card.

The LIST option produces the transaction, old master, and new master confirmation listings. If this option is not specified, its default, NOLIST, is in effect and none of these confirmation listings will be produced.

If the NOLIST option is specified, neither the transaction, old master, nor new master listings will be produced. Specifying the NOLIST option produces the same result as not specifying LIST.

Individual confirmation listings may be requested by the LISTTRAN, LISTOLD, and LISTNEW options. These three options can be requested in any combination, but only those listings specified will be produced. If neither LISTTRAN, LISTOLD, LISTNEW, nor LIST is specified, the default option NOLIST is in effect. Note that specifying all three individual options (LISTTRAN, LISTOLD, and LISTNEW) is the same as specifying LIST.

The FLAGW option produces a listing of warning messages generated by AFMMSTR (AQ0100). When this option is specified, each warning message (and the internal transaction to which it refers) is listed in the diagnostic report. If the FLAGW option is not specified, its default, NOFLAGW, is in effect and no warning messages will be listed.

If the NOFLAGW option is specified, warning messages will not be listed; however, all other diagnostic messages will still be listed. Specifying the NOFLAGW option produces the same result as not specifying FLAGW.

If no option card is included in the execution deck, or if an invalid option card is included, the default options NOLIST and NOFLAGW will be in effect.

4.5.3.4 Error Messages

AFMMSTR 001 ERROR - READING xx - ATTEMPT TO ADD DATA TO EXISTING READING - DATA REJECTED

Meaning: The specified master file record already contained a reading in the position indicated for adding reading xx. Reading xx was, therefore, rejected.

Action: Correct and resubmit.

AFMMSTR 002 WARNING - READING xx - VALUE NOT SPECIFIED - FILLED WITH NINES (*yyyyyyyyyyyyy-yyyyyyyy-yyyyyyyyy*)

Meaning: No value was specified for reading xx in the record with key *yyyyyyyyyyyyy-yyyyyyyy-yyyyyyyyy*. Since subsequent readings were specified for this record, this reading is set to the null value (9999) as a place-holder.

Action: None.

AFMMSTR 003 ERROR - NO MATCHING KEY FOUND ON MASTER FILE - TRANSACTION REJECTED

Meaning: There is no corresponding record in the master file for this transaction.

Action: Correct and resubmit.

---

xx - Reading Number

AFMMSTR 004 ERROR - READING xx - ATTEMPT TO CHANGE NON-EXISTING READING - DATA REJECTED

Meaning: A change transaction was submitted for a non-existent or null reading in the specified master file record. The reading was, therefore, rejected.

Action: Correct and resubmit.

AFMMSTR 005 - CONDITIONAL - MISSING OR INVALID OPTION CARD - DEFAULT OPTIONS (NOLIST NOFLAGW) USED

Meaning: An invalid option was specified, or no option card submitted. The program was executed using the default options NOLIST and NOFLAGW.

Action: None.

AFMMSTR 006 ABORT - TRANSACTION FILE IS NOT IN PROPER SORT SEQUENCE

Meaning: The input file of internal transactions has not been sorted and, therefore, the run was terminated. Do not use the output from this run.

Action: Sort the internal transactions using the master file internal transaction sort program ASRINTR (AQ0130).

AFMMSTR 007 DISASTER - DUPLICATE RECORD IN OLD MASTER FILE
MASTER FILE RECORD KEY 1 = XXX
MASTER FILE RECORD KEY 2 = XXX
TRANSACTION RECORD KEY = XXX

Meaning: Two master file records with the same key were found and, therefore, the run was terminated. Do not use the output from this run.

Action: Call NADB.

---

xx - Reading Number

```
AFMMSTR 008 ABORT - MASTER FILE IS OUT OF SEQUENCE
            MASTER FILE RECORD KEY 1 = XXX
            MASTER FILE RECORD KEY 2 = XXX
            TRANSACTION RECORD KEY = XXX
```

Meaning: An out-of-sequence master file record was found and, therefore, the run was terminated. Do not use the output from this run.

Action: Determine if the input master file has been sorted by the master file sort program ASRMSTR (AQ0140). If it has been, re-execute AFMMSTR (AQ0100) using the correct master file (i.e., a master file that has not been sorted by ASRMSTR (AQ0140)). If the correct master file was used, there is a serious problem with that master file, and the user should contact NADB.

```
AFMMSTR 009 DISASTER - NEW MASTER FILE WILL BE OUT OF SEQUENCE
            MASTER FILE RECORD KEY 1 = XXX
            MASTER FILE RECORD KEY 2 = XXX
            TRANSACTION RECORD KEY = XXX
```

Meaning: AFMMSTR (AQ0100) attempted to create a new master file record with a key less than or equal to that of the last master file record written and, therefore, the run was terminated. Do not use the output from this run.

Action: Call NADB.

4.5.3.5 Cataloged JCL

4.5.3.5.1 JCL listing - AFMMSTR (AQ0100) is executed by the cataloged procedure AQFMM10. The procedure also executes the master file internal transaction sort program ASRINTR (AQ0130). See Figure 4.5.3-d for a listing of this procedure.

4.5.3.5.2 Cross-reference of DD names and files

Program Name: ASRINTR (AQ0130)

DD Name	File Description	Input/Output
AQSINPUT	Unsorted internal transactions	Input
AQSOUTPT	Sorted internal transactions	Output
AQSPRINT	Diagnostic report	Output
SORTWK01	Sort work file	Internal

Program Name: AFMMSTR (AQ0100)

DD Name	File Description	Input/Output
AQSINPUT	Option card	Input
AQSINTRN	Sorted internal transactions	Input
AQSOLDMS	Old AQDHS-II master file	Input
AQSNEWMS	New or updated AQDHS-II master file	Output
AQSCONFR	Internal transaction confirmation listing	Output
AQSOLDRC	Old master file confirmation listing	Output
AQSNEWRC	New master file confirmation listing	Output
AQSPRINT	Diagnostic report	Output

4.5.3.5.3 User-supplied JCL - To execute the cataloged procedure AQFMM10, the user must specify the data set names of the input (old) master file, the input internal transactions, and the output (new or updated) master file. See Figure 4.5.3-e for a description of the procedure's substitutable parameters.

4.5.3.5.4 Sample run stream - The following run stream would update the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.AQ1029C2'. The NOLIST and

FLAGW options are specified; the updated master file is named 'CN.EPALMH.AQ087.CDHS.HQ.AQS.DATA.AQ1019CC'.

```
// EXEC AQFMM10,
//      OLDMSTR=AQ1029C2,
//      NEWMSTR=AQ1019CC
//UPDATE.INPUT DD *
NOLIST FLAGW
/*
```

4.5.3.6 Warnings and Special Instructions

The AQDHS-II master file is constructed to contain a variable number of readings up to a maximum of 31 (see Figure 4.5.3-a for the format of the master file). The number of readings contained in any master file record depends on the time code of that record; i.e., a record can consist of hourly readings for one day, daily readings for one month, one weekly reading, monthly readings for one year, and quarterly readings for one year. When coding transactions to update the master file, the correct date (year, month, day) for each reading must be coded to insure that the reading is inserted in the correct position on the appropriate master file record. Moreover, for less-than-daily data, the time code, the start hour, and the relative position of the reading in the repeating section identify the hour at which that particular reading was taken. Therefore, care must be taken when coding less-than-daily data (Form 1 transactions only) to position the reading in the correct relative position.

The following examples illustrate adding data to an existing master file record. Note that the transactions illustrated in these examples are not internal format transactions. They are AQDHS-II transactions and have to be submitted to the master file transaction edit program AEDMSTR (AQ0060) for editing and conversion to internal format transactions prior to their use as input to AFMMSTR (AQ0100).

Example 1: The master file record contains one-hourly (time code = 1) readings for hours 00-07 and you wish to add readings for hours 12-23. Since a Form 1 transaction can accommodate only eight (8) readings per card, you should code two transactions: first, an add transaction with start hour 08 and blanks in the positions for the first four readings, followed by the readings for hours 12-15; second, an add transaction with start hour 16 and the readings for hours 16-23. See Figure 4.5.3-f, Example 1.

Example 2: The master file record contains three two-hourly (time code = 2) readings for hours 04, 06, and 08 and you wish to add readings for hours 00 and 02. You should code an add transaction even though the master file record contains null readings in these two positions. See Figure 4.5.3-f, Example 2.

The delete transaction can only be used to delete an entire master file record. Only the key fields and the action code must be coded on the delete transaction.

To delete a particular reading from a master file record, you must create a change transaction to change that reading to a null value (9999). That reading will then be deleted from your file and from the SAROAD file by ARPSARD (AQ0220) when you submit your data to SAROAD (see Section 6.3.2 AQHDS-II to SAROAD conversion).

4.5.3.7 Cost Considerations

The estimates listed below are for the execution of AFMMSTR (AQ0100) on an IBM 370/168.

Number of old AQDHS-II master file records:	237 records
Number of internal transactions:	26 transactions
Number of updated AQDHS-II master file records:	263 records
CPU time:	.6 second
I/O time:	4.8 seconds
Total time:	5.4 seconds
Estimated cost:	$1.13

4.5.3.8 Related Programs and Procedures

The cataloged procedure AQEMM10 may be executed to edit and convert AQDHS-II input transactions, sort the resultant internal transactions, and update (or create) the AQDHS-II master file. See Section 4.6.1 Master File Edit-Maintenance for a complete description of this procedure.

Record Position	Field Length	Description		
1	1	Action Code		
2	1	Form Code		
3	1	Record Submission Status Flag		
4 - 7	4	Reserved Area		
8 - 9	2	State Code	Sort Key 1	Sequence Key
10 - 12	3	AQCR Code		
13 - 16	4	County Code		
17 - 20	4	Area Code		
21 - 23	3	Site Code		
24	1	Agency Code		
25 - 26	2	Project Code		
27	1	Time Code		
28 - 29	2	Year		
30 - 34	5	Parameter Code	Sort Key 2	
35 - 36	2	Method Code		
37 - 38	2	Units Code		
39 - 40	2	Month	Sort Key 3	
41 - 42	2	Day		
43 - 44	2	Start Hour		
45	1	SLAMS/NAMS ID		
46 - 55	10	Reserved Area		
56 - 57	2	Number of Readings		
58	1	Reading Status Flag	Repeating Section (Occurs 1 to 31 times)	
59	1	Decimal Code		
60 - 63	4	Reading		

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Figure 4.5.3-a. AQDHS-II Master File Format

Record Position	Field Length	Description		
1	1	Action Code		
2	1	Form Code		
3	1	Record Submission Status Flag		
4 - 7	4	Reserved Area		
8 - 9	2	State Code	Sort Key 1	Sequence Key
10 - 12	3	AQCR Code		
13 - 16	4	County Code		
17 - 20	4	Area Code		
21 - 23	3	Site Code		
24	1	Agency Code		
25 - 26	2	Project Code		
27	1	Time Code		
28 - 29	2	Year		
30 - 34	5	Parameter Code	Sort Key 2	
35 - 36	2	Method Code		
37 - 38	2	Units Code		
39	2	Composite Type	Sort Key 3	
40		Composite Time Code		
41 - 42	2	Composite Period		
43 - 44	2	Composite Number of Samples		
45	1	SLAMS/NAMS ID		
46 - 55	10	Reserved Area		
56 - 57	2	Number of Readings		
58	1	Reading Status Flag	Repeating Section (Occurs 1 to 31 times)	
59	1	Decimal Code		
60 - 63	4	Reading		

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Figure 4.5.3-a. AQDHS-II Master File Format - Composite Data

```
                    AQDHS-II MASTER FILE MAINTENANCE PROGRAM - INPUT MASTER FILE CONFIRMATION LISTING          PAGE     1
FIXED SEGMENT
                    REPEATING DATA                                                                            ACTION

21T     10049108000001001E0217142401110706060 0              24
                    V20080V20100V20101V20102V20102V20110V20113V20110V20110V20121V20110V20100V20080V20080V20090V20090  CHANGED
                    V20099V20099V20099V20100V20100V20100V20121V20122

21T     10049108000001001E02171424011107060700              24
                    V20248V20200V20201V20181V20176V20154V20121V20100V20090V20080V20070V20060V20040V20030V20020V20010  DELETED
                    V20009V20008V20007V20006V20006V20006V20006V20006

21T     10049108000001001E02171424011107062100              24
                    V20003V20003V20003V20003V20003V20006V20018V20020V20034V20044V20054V20060V20080V20100V20101V20102  DELETED
                    V20102V20110V20113V20110V20110V20121V20110V20109

21T     10049108000001001E02171424011107062200              24
                    V20080V20080V20090V20090V20099V20099V20099V20100V20100V20100V20121V20122V20248V20200V20201V20181  CHANGED
                    V20176V20154V20121V20100V20090V20080V20070V20060

NUMBER OF INPUT MASTER FILE RECORDS:                         318
NUMBER OF INPUT MASTER FILE RECORDS LISTED:                    4
```

Figure 4.5.3-b. Optional Listings (page 1 of 3)

```
                AQDHS-II MASTER FILE MAINTENANCE PROGRAM  -  INTERNAL TRANSACTION CONFIRMATION LISTING      PAGE    1
INTERNAL TRANSACTION                          ACTION
21      1206001400001003C01173611025014091200           0080005000600040003000300020005000З
                                          *** ADDED
21      1206001400001003C01173611025014091208           00800030004000300040003000300030002
                                          *** ADDED
21      1206001400001003C01173611025014091216           00800030002000400030003000200040003
                                          *** ADDED
21      1206001400001003C01174611022114061000           00800010002000400030002000300020001
                                          *** ADDED
21      1206001400001003C01174611022114061008           00800020001000300000002000400020004
                                          *** ADDED
21      1206001400001003C01174611022114061016           00800050003000200010002000200030004
                                          *** ADDED
31      3718630203000997A0526362101201501010О           103900091009200
                                          *** CHANGED
31      37186302030009997A05263621012015010200          003900091009200
                                          *** CHANGED
31      3718630203000997A05263621012015010300           303900091009200
                                          *** CHANGED
31      3718630203000997A05263621012015010400           203900091009200
                                          *** CHANGED
31      3718630203000997A05263621012015010500           203900091009200
                                          *** CHANGED
NUMBER OF INPUT INTERNAL TRANSACTIONS:                  11
```

Figure 4.5.3-b - continued. Optional Listings (page 2 of 3)

```
                 AQDHS-II MASTER FILE MAINTENANCE PROGRAM - OUTPUT MASTER FILE CONFIRMATION LISTING        PAGE     1

FIXED SEGMENT                                                                                               ACTION
                    REPEATING DATA

21N    1206001400001003C01173611025014091200            24                                                  ADDED
                    A00005A00006A00004A00003A00003A00002A00005A00003A00003A00004A00003A00004A00003A00003A00003A00002
                    A00003A00002A00004A00003A00003A00002A00004A00003

21N    1206001400001003C01174611022114061000            24                                                  ADDED
                    A00001A00002A00004A00003A00002A00003A00002A00001A00002A00001A00003A00000A00002A00004A00002A00004
                    A00005A00003A00002A00001A00002A00002A00003A00004

31N    3718630203000997A05263621012015010100            12                                                  CHANGED
                    C19000C19100C19200S09300S09400S09500S09600S09700S09800S09900S09901S09902

31N    3718630203000997A05263621012015010200            12                                                  CHANGED
                    C09000C09100C09200S19300S19400S19500S19600S19700S19800S19900S19901S19902

31N    3718630203000997A05263621012015010300            12                                                  CHANGED
                    C39000C39100C39200S29300S29400S29500S29600S29700S29800S29900S29901S29902

31N    3718630203000997A05263621012015010400            12                                                  CHANGED
                    C29000C29100C29200S39300S39400S39500S39600S39700S39800S39900S39901S39902

31N    3718630203000997A05263621012015010500            12                                                  CHANGED
                    C29000C29100C29200S49300S49400S49500S49600S49700S49800S49900S49901S49902

NUMBER OF OUTPUT MASTER FILE RECORDS:                    41
NUMBER OF OUTPUT MASTER FILE RECORDS LISTED:              7
```

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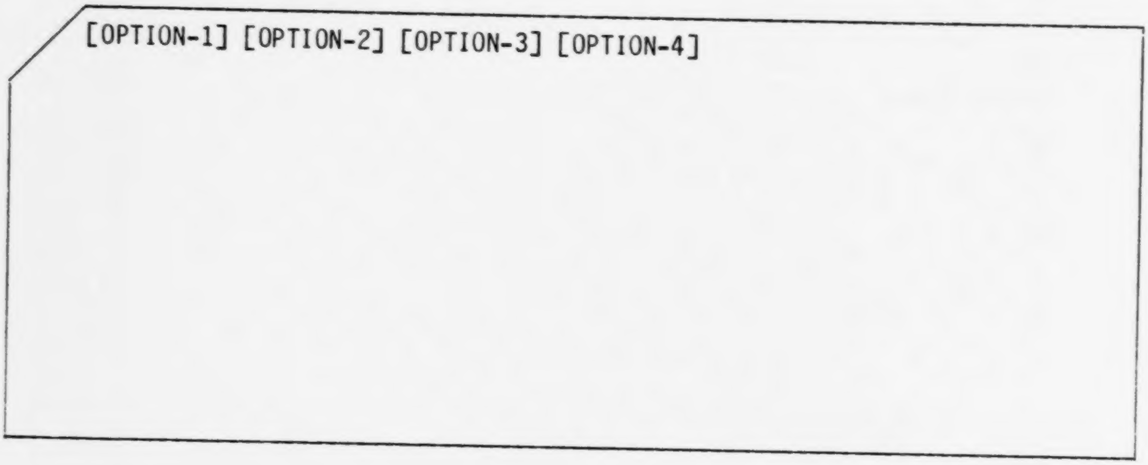
Figure 4.5.3-b - continued. Optional Listings



```
[OPTION-1] [OPTION-2] [OPTION-3] [OPTION-4]
```

The options can appear in any order and in any position on the card subject to the following rules:

1. There can be only one card.
2. All options must be punched within columns 1 through 72, inclusive.
3. There must be at least one space between two successive options. A comma may be used as a separator rather than a space, and a space may precede and/or follow the comma.

Figure 4.5.3-c. Option Card Format

```
//*
//*    PROCEDURE NAME: AQFMM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO MAINTAIN THE AQDHS-II MASTER
//*    FILE USING PREVIOUSLY EDITED TRANSACTIONS
//*
//*
//AQFMM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROG1=ASRINTR,
//             PROG2=AFMMSTR,
//             R1=100K,
//             R2=120K,
//             TIME1='3,0',
//             TIME2='3,0',
//             OLDMSTR=AQOLDMST,
//             NEWMSTR=AQNEWMST,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP1='OLD,DELETE',
//             DISP2='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             TEMP=SYSDA,
//             WORKSPC=50,
//             TRANS=TRANS,
//             OUT=A
//*
//SORT    EXEC PGM=&PROG1,
//             REGION=&R1,
//             TIME=(&TIME1)
//*
//* SORT INTERNAL TRANSACTIONS INTO FILE SEQUENCE
//*
//STEPLIB  DD DSNAME=&PROJECT..LOAD,
//            VOLUME=(PRIVATE,RETAIN),
//            DISP=(SHR,PASS)
//SORTLIB   DD DSNAME=SYS1.SORTLIB,
//            DISP=(SHR,PASS)
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SORTWK01  DD UNIT=&TEMP,
//             SPACE=(TRK,(&WORKSPC),,CONTIG)
//*
//SORTWK02  DD  UNIT=(&TEMP,SEP=SORTWK01),
//             SPACE=(TRK,(&WORKSPC),,CONTIG)
//*
//SORTWK03  DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02)),
//             SPACE=(TRK,(&WORKSPC),,CONTIG)
//*
//* INPUT DATA SET - INTERNAL TRANSACTIONS
//*
//AQSINPUT  DD DSNAME=&PROJECT..DATA.&TRANS,
//             DISP=(&DISP1)
```

(page 1 of 3)

Figure 4.5.3-d. Cataloged Procedure AQFMM10

```
//*
//* OUTPUT DATA SET - SORTED INTERNAL TRANSACTIONS
//*
//AQSOUTPT  DD UNIT=&TEMP,
//             DISP=(NEW,PASS,DELETE),
//             SPACE=(TRK,(&WORKSPC),RLSE),
//             DSNAME=&&SORTED
//*
//* OUTPUT DATA SET - SUMMARY INFORMATION
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//*
//UPDATE  EXEC PGM=&PROG2,
//             REGION=&R2,
//             TIME=(&TIME2)
//*
//* MAINTAIN AQDHS-II MASTER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - FILE MAINTENANCE CONTROL CARD
//*
//AQSINPUT  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - SORTED INTERNAL TRANSACTIONS
//*
//AQSINTRN  DD DSNAME=&&SORTED,
//             DISP=(OLD,DELETE)
//*
//* INPUT DATA SET - OLD MASTER FILE
//*
//AQSOLDMS  DD DSNAME=&PROJECT..DATA.&OLDMSTR,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - NEW MASTER FILE
//*
//AQSNEWMS  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP2),
```

(page 2 of 3)

Figure 4.5.3-d - continued. Cataloged Procedure AQFMM10

```
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),                00011700
//             DSNAME=&PROJECT..DATA.&NEWMSTR                            00011800
//*                                                                      00011900
//* OUTPUT DATA SET - INTERNAL TRANSACTION LISTING                       00012000
//*                                                                      00012100
//AQSCONFR  DD SYSOUT=&OUT                                               00012200
//*                                                                      00012300
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                                00012400
//*                                                                      00012500
//AQSPRINT  DD SYSOUT=&OUT                                               00012600
//*                                                                      00012700
//* OUTPUT DATA SET - OLD MASTER LISTING                                 00012800
//*                                                                      00012900
//AQSOLDRC  DD SYSOUT=&OUT                                               00013000
//*                                                                      00013100
//* OUTPUT DATA SET - NEW MASTER LISTING                                 00013200
//*                                                                      00013300
//AQSNEWRC  DD SYSOUT=&OUT                                               00013400
//*                                                                      00013500
//* OUTPUT DATA SETS - SYSTEM OPERATION                                  00013600
//*                                                                      00013700
//SYSPRINT  DD SYSOUT=&OUT                                               00013800
//*                                                                      00013900
//SYSOUT    DD SYSOUT=&OUT                                               00014000
//*                                                                      00014100
//SYSDBOUT  DD SYSOUT=&OUT                                               00014200
//*                                                                      00014300
//SYSDTERM  DD SYSOUT=&OUT                                               00014400
//*                                                                      00014500
//SYSUDUMP  DD SYSOUT=&OUT                                               00014600
//*                                                                      00014700
```

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Figure 4.5.3-d - continued. Cataloged Procedure AQFMM10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQOLDMST would be the full data set name of the old master file)
PROG1	ASRINTR	Master file internal transaction sort program
PROG2	AFMMSTR	Master file maintenance program
R1	100K	Region size allocated for execution of ASRINTR
R2	120K	Region size allocated for execution of AFMMSTR
TIME1	'3,0'	Time allocated for execution of ASRINTR
TIME2	'3,0'	Time allocated for execution of AFMMSTR
OLDMSTR	AQOLDMST	Lowest-level index of old master file
NEWMSTR	AQNEWMST	Lowest-level index of new (or updated) master file
UNIT	3330	Unit type to which new (or updated) master file is to be written
SERIAL	CDHSPK	Serial number of volume to which new (or updated) master file is to be written
DISP1	'OLD,DELETE'	Disposition of internal transactions
DISP2	'NEW,CATLG, DELETE'	Disposition of new (or updated) master file
SPCUNIT	TRK	Units in which space for new (or updated) master file is to be allocated
PRIMARY	20	Primary space allocation for new (or updated) master file
SECNDRY	10	Secondary space allocation for new (or updated) master file
TEMP	SYSDA	Unit type for temporary work space

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Figure 4.5.3-e. Substitutable Parameters for AQFMM10

Parameter Name	Default Value	Description
WORKSPC	50	Space allocation for sort work areas
TRANS	TRANS	Lowest level index of unsorted internal transactions
OUT	A	SYSOUT class for all print files

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Figure 4.5.3-e - Continued. Substitutable Parameters for AQFMM10

Example 1:

Col #	1	2-20	21-22	23-32	33-36	37-40	41-44	45-48	49-52	53-56	57-60	61-64	65-79	80
Entry	1	...	08	...	blanks	blanks	blanks	blanks	reading	reading	reading	reading	blanks	A

Col #	1	2-20	21-22	23-32	33-36	37-40	41-44	45-48	49-52	53-56	57-60	61-64	65-79	80
Entry	1	...	16	...	reading	reading	reading	reading	reading	reading	reading	reading	blanks	A

Example 2:

Col #	1	2-20	21-22	23-32	33-36	37-40	41-64	65-79	80
Entry	1	...	00	...	reading	reading	blanks	blanks	A

NOTE: '...' indicates that the fields in this range must be coded.

Figure 4.5.3-f. Sample Transactions to Modify Existing Master File Records

```
                         AQDHS-II MASTER FILE MAINTENANCE PROGRAM  -  DIAGNOSTIC REPORT                PAGE    1
PROGRAM NAME: AFMMSTR (AQ0100)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED:  OCTOBER 31, 1978

                  TABLE # 1
        SIGNED
        NUMBER                 LAST DIGIT
                               OF NUMBER
                               PRINTED
--------------------------------------------
           -9                           R
           -8                           Q
           -7                           P
           -6                           O
           -5                           N
           -4                           M
           -3                           L
           -2                           K
           -1                           J
           -0
           +0                           \
           +1                           A
           +2                           B
           +3                           C
           +4                           D
           +5                           E
           +6                           F
           +7                           G
           +8                           H
           +9                           I

THIS TABLE SHOWS THE PRINT CHARACTERS
FOR THE LAST DIGIT OF SIGNED DATA VALUES
WHICH MAY APPEAR IN THE AQDHS-II
MASTER FILE MAINTENANCE OUTPUT REPORTS

OPTIONS IN EFFECT:  LIST FLAGW
```

Figure 4.5.3-g. Diagnostic Report

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```
                    AQDHS-II MASTER FILE MAINTENANCE PROGRAM  -  DIAGNOSTIC REPORT                  PAGE    2

TRANSACTION                      ERRORS/ACTION

21      37186302030009 97A05277431021107080200          20800670050003100 7100830
           *** AFMMSTR 001 ERROR - READING 02 - ATTEMPT TO ADD DATA TO EXISTING READING - DATA REJECTED

NUMBER OF INPUT INTERNAL TRANSACTIONS:                    122
NUMBER OF INPUT MASTER FILE RECORDS:                      341
NUMBER OF MASTER FILE RECORDS FLAGGED FOR DELETION:         0
NUMBER OF MASTER FILE RECORDS ADDED:                       37
NUMBER OF OUTPUT MASTER FILE RECORDS:                     378
NUMBER OF WARNING MESSAGES:                                 0
NUMBER OF CONDITIONAL MESSAGES:                             1
NUMBER OF ERROR MESSAGES:                                   1
NUMBER OF ABORT MESSAGES:                                   0
NUMBER OF DISASTER MESSAGES:                                0

PROGRAM NAME: AFMMSTR (AQ0100)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED:  OCTOBER 31, 1978
```

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Figure 4.5.3-g - continued. Diagnostic Report

4.6 MULTI-PROGRAM PROCEDURES

4.6.1 MASTER FILE EDIT-MAINTENANCE PROCEDURE - AQEMM10

4.6.1.1 Cataloged JCL

The cataloged procedure AQEMM10 allows the user to edit AQDHS-II transactions and update (or create) the AQDHS-II master file in one job run. This procedure executes the master file transaction edit program AEDMSTR (AQ0060), the master file internal transaction sort program ASRINTR (AQ0130), and the master file maintenance program AFMMSTR (AQ0100).

4.6.1.1.1 JCL listing - See Figure 4.6.1-a for a listing of this procedure.

4.6.1.1.2 Cross-reference of DD names and files

Program Name: AEDMSTR (AQ0060)

DD Name	File Description	Input/Output
AQSTRANS	AQDHS-II transactions	Input
AQSPARMS	Parameter file	Input
AQSSITES	Site file	Input
AQSOPTIN	Option card	Input
AQSINTRN	Edited internal transactions	Output
AQSCONFR	Input transaction confirmation listing	Output
AQSPRINT	Diagnostic report	Output

Program Name: ASRINTR (AQ0130)

DD Name	File Description	Input/Output
AQSINPUT	Unsorted internal transactions	Input
AQSOUTPT	Sorted internal transactions	Output
AQSPRINT	Diagnostic report	Output

Program Name: AFMMSTR (AQ0100)

DD Name	File Description	Input/Output
AQSINPUT	Option card	Input
AQSINTRN	Sorted internal transactions	Input
AQSOLDMS	Old AQDHS-II master file	Input
AQSNEWMS	New or updated AQDHS-II master file	Output
AQSCONFR	Internal transaction confirmation listing	Output
AQSOLDRC	Old master file confirmation listing	Output
AQSNEWRC	New master file confirmation listing	Output
AQSPRINT	Diagnostic report	Output

4.6.1.1.3 User-supplied JCL - To execute the cataloged procedure AQEMM10, the user can expect to supply job accounting information; input transactions; the data set names of both the old and the updated (or new) AQDHS-II master file, the parameter file, and the site file; and option cards to specify any desired options. See Figure 4.6.1-b for a description of the procedure's substitutable parameters.

4.6.1.1.4 Sample run stream - The following run stream illustrates the use of AQEMM10 to create an AQDHS-II master file from input transactions stored on disk in a data set named CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQTRANS. The new master file will be named CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQ1029V3; the data set names of the parameter and site files are their respective default values; and the LIST and FLAGW options are specified for AEDMSTR (AQ0060) and for AFMMSTR (AQ0100).

```
// EXEC AQEMM10,
//      NEWMSTR=AQ1029V3
//EDIT.INPUT DD DISP=OLD,
//           DSN=CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQTRANS
//EDIT.OPTIONS DD *
LIST FLAGW
/*
//UPDATE.AQSOLDMS DD DUMMY
//UPDATE.INPUT DD *
LIST FLAGW
```

```
//*
//*    PROCEDURE NAME: AQEMM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO EDIT AQDHS-II TRANSACTIONS AND
//*    USE THE EDITED TRANSACTIONS TO MAINTAIN THE AQDHS-II MASTER FILE
//*
//*
//AQEMM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROG1=AEDMSTR,
//             PROG2=ASRINTR,
//             PROG3=AFMMSTR,
//             REGION1=120K,
//             REGION2=100K,
//             REGION3=100K,
//             TIME1='3,0',
//             TIME2='3,0',
//             TIME3='3,0',
//             OLDMSTR=AQOLDMST,
//             NEWMSTR=AQNEWMST,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             TEMP=SYSDA,
//             WORKSPC=50,
//             OUT=A
//*
//EDIT    EXEC PGM=&PROG1,
//             REGION=&REGION1,
//             TIME=(&TIME1)
//*
//* EDIT AQDHS-II MASTER FILE TRANSACTIONS
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - EDIT OPTIONS CONTROL CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - AQDHS-II MASTER FILE TRANSACTIONS
//*
//AQSTRANS  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - PARAMETER FILE
//*
```

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Figure 4.6.1-a. Cataloged Procedure AQEMM10

```
//AQSPARMC  DD DSNAME=&PROJECT..DATA.&PARMFIL,                          00005900
//             VOLUME=(PRIVATE,RETAIN),                                 00006000
//             DISP=(SHR,PASS)                                          00006100
//*                                                                     00006200
//* INPUT DATA SET - SITE FILE                                          00006300
//*                                                                     00006400
//AQSSITES  DD DSNAME=&PROJECT..DATA.&SITEFIL,                          00006500
//             VOLUME=(PRIVATE,RETAIN),                                 00006600
//             DISP=(SHR,PASS)                                          00006700
//*                                                                     00006800
//* OUTPUT DATA SET - AQDHS-II INTERNAL TRANSACTIONS                    00006900
//*                                                                     00007000
//AQSINTRN  DD UNIT=&TEMP,                                              00007100
//             DISP=(NEW,PASS,DELETE),                                  00007200
//             SPACE=(TRK,(&WORKSPC),RLSE),                             00007300
//             DSNAME=&&TRANS                                           00007400
//*                                                                     00007500
//* OUTPUT DATA SET - TRANSACTION LISTING                               00007600
//*                                                                     00007700
//AQSCONFR  DD SYSOUT=&OUT                                              00007800
//*                                                                     00007900
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00008000
//*                                                                     00008100
//AQSPRINT  DD SYSOUT=&OUT                                              00008200
//*                                                                     00008300
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00008400
//*                                                                     00008500
//SYSPRINT  DD SYSOUT=&OUT                                              00008600
//*                                                                     00008700
//SYSOUT    DD SYSOUT=&OUT                                              00008800
//*                                                                     00008900
//SYSDBOUT  DD SYSOUT=&OUT                                              00009000
//*                                                                     00009100
//SYSDTERM  DD SYSOUT=&OUT                                              00009200
//*                                                                     00009300
//SYSUDUMP  DD SYSOUT=&OUT                                              00009400
//*                                                                     00009500
//SORT    EXEC PGM=&PROG2,                                              00009600
//             REGION=&REGION2,                                         00009700
//             TIME=(&TIME2)                                            00009800
//*                                                                     00009900
//* SORT INTERNAL TRANSACTIONS INTO FILE SEQUENCE                       00010000
//*                                                                     00010100
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00010200
//             VOLUME=(PRIVATE,RETAIN),                                 00010300
//             DISP=(SHR,PASS)                                          00010400
//SORTLIB   DD DSNAME=SYS1.SORTLIB,                                     00010500
//             DISP=(SHR,PASS)                                          00010600
//*                                                                     00010700
//SYSOUT    DD SYSOUT=&OUT                                              00010800
//*                                                                     00010900
//SORTWK01  DD UNIT=&TEMP,                                              00011000
//             SPACE=(TRK,(&WORKSPC),,CONTIG)                           00011100
//*                                                                     00011200
//SORTWK02  DD UNIT=(&TEMP,SEP=SORTWK01),                               00011300
//             SPACE=(TRK,(&WORKSPC),,CONTIG)                           00011400
//*                                                                     00011500
//SORTWK03  DD UNIT=(&TEMP,SEP=(SORTWK01,SORTWK02)),                    00011600
```

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Figure 4.6.1-a - continued. Cataloged Procedure AQEMM10

```
//              SPACE=(TRK,(&WORKSPC),,CONTIG)
//*
//* INPUT DATA SET - UNSORTED INTERNAL TRANSACTIONS
//*
//AQSINPUT  DD DSNAME=&&TRANS,
//              DISP=(OLD,DELETE)
//*
//* OUTPUT DATA SET - SORTED INTERNAL TRANSACTIONS
//*
//AQSOUTPT  DD UNIT=&TEMP,
//              DISP=(NEW,PASS,DELETE),
//              SPACE=(TRK,(&WORKSPC),RLSE),
//              DSNAME=&&SORTED,
//              DCB=(RECFM=FB,LRECL=68,BLKSIZE=1632)
//*
//* OUTPUT DATA SET - SUMMARY INFORMATION
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//*
//UPDATE  EXEC PGM=&PROG3,
//              REGION=&REGION3,
//              TIME=(&TIME3)
//*
//* MAINTAIN AQDHS-II MASTER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - FILE MAINTENANCE CONTROL CARD
//*
//AQSINPUT  DD DDNAME=OPTIONS,
//              DCB=BLKSIZE=80
//*
//* INPUT DATA SET - SORTED INTERNAL TRANSACTIONS
//*
//AQSINTRN  DD DSNAME=&&SORTED,
//              DISP=(OLD,DELETE)
//*
//* INPUT DATA SET - OLD AQDHS-II MASTER FILE
//*
//AQSOLDMS  DD DSNAME=&PROJECT..DATA.&OLDMSTR,
//              VOLUME=(PRIVATE,RETAIN),
```

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Figure 4.6.1-a - continued. Cataloged Procedure AQEMM10

```
//             DISP=(SHR,PASS)                                          00017500
//*                                                                     00017600
//* OUTPUT DATA SET - NEW AQDHS-II MASTER FILE                          00017700
//*                                                                     00017800
//AQSNEWMS  DD UNIT=&UNIT,                                              00017900
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),                     00018000
//             DISP=(&DISP),                                            00018100
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),               00018200
//             DSNAME=&PROJECT..DATA.&NEWMSTR                           00018300
//*                                                                     00018400
//* OUTPUT DATA SET - INTERNAL TRANSACTION LISTING                      00018500
//*                                                                     00018600
//AQSCONFR  DD SYSOUT=&OUT                                              00018700
//*                                                                     00018800
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00018900
//*                                                                     00019000
//AQSPRINT  DD SYSOUT=&OUT                                              00019100
//*                                                                     00019200
//* OUTPUT DATA SET - OLD MASTER LISTING                                00019300
//*                                                                     00019400
//AQSOLDRC  DD SYSOUT=&OUT                                              00019500
//*                                                                     00019600
//* OUTPUT DATA SET - NEW MASTER LISTING                                00019700
//*                                                                     00019800
//AQSNEWRC  DD SYSOUT=&OUT                                              00019900
//*                                                                     00020000
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00020100
//*                                                                     00020200
//SYSPRINT  DD SYSOUT=&OUT                                              00020300
//*                                                                     00020400
//SYSOUT    DD SYSOUT=&OUT                                              00020500
//*                                                                     00020600
//SYSDBOUT  DD SYSOUT=&OUT                                              00020700
//*                                                                     00020800
//SYSDTERM  DD SYSOUT=&OUT                                              00020900
//*                                                                     00021000
//SYSUDUMP  DD SYSOUT=&OUT                                              00021100
//*                                                                     00021200
```

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Figure 4.6.1-a - continued. Cataloged Procedure AQEMM10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMSTOLD)
PROG1	AEDMSTR	Master file transaction edit program
PROG2	ASRINTR	Master file internal transaction sort program
PROG3	AFMMSTR	Master file maintenance program
REGION1	120K	Region size allocated for execution of AEDMSTR
REGION2	100K	Region size allocated for execution of ASRINTR
REGION3	100K	Region size allowed for execution of AFMMSTR
TIME1	'3,0'	Time allocated for execution for AEDMSTR
TIME2	'3,0'	Time allocated for execution of ASRINTR
TIME3	'3,0'	Time allocated for execution of AFMMSTR
OLDMSTR	AQOLDMST	Lowest-level index of old master file
NEWMSTR	AQNEWMST	Lowest-level index of new (or updated) master file
PARMFIL	AQPARMFL	Lowest-level index of parameter file
SITEFIL	AQSITEFL	Lowest-level index site file
UNIT	3330	Unit type to which new (or updated) master file is to be written
SERIAL	CDHSPK	Serial number of volume to which new (or updated) master file is to be written
DISP	'NEW,CATLG, DELETE'	Disposition of new (or updated) master file

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Figure 4.6.1-b. Substitutable Parameters for AQEMM10

Parameter Name	Default Value	Description
SPCUNIT	TRK	Units in which space for new (or updated) master file is to be allocated
PRIMARY	20	Primary space allocation for new (or updated) master file
SECNDRY	10	Secondary space allocation for new (or updated) master file
TEMP	SYSDA	Unit type for temporary work space
WORKSPC	50	Space allocation for sort work areas
OUT	A	SYSOUT class for all print files

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Figure 4.6.1-b - Continued. Substitutable Parameters for AQEMM10

5.0 DATA ACCESSING AND MANIPULATION

5.1 INTRODUCTION

AQDHS-II provides the user with various data accessing and manipulation capabilities which are primarily designed to perform intermediate steps in the production of AQDHS-II reports. These are (1) the capability to extract or retrieve specific data from the master file, (2) the capability to perform various statistical analyses on data from the master file, (3) the capability to archive data from the master file and to merge archived and active master files (or any two distinct master files), (4) the capability to convert data into formats required by various programs or to convert the units in which data is recorded, and (5) the capability to sort the master file as required by various programs.

5.2 RETRIEVAL

5.2.1 INTRODUCTION

The retrieval function in AQDHS-II is performed by executing two programs: the retrieval languages processor program, ARTLNGP (AQ0110), and the generated retrieval program, ARTGENR (AQ0120). The retrieval language processor program must be executed first. All retrieval specifications are processed by ARTLNGP (AQ0110) and, based upon the retrieval specifications, ARTLNGP (AQ0110) produces the second retrieval program, ARTGENR (AQ0120), which is referred to as the generated retrieval program. This generated retrieval program must then be compiled and link edited before it can be executed. When it is executed, it processes master file records and selects those records which satisfy the retrieval specifications that were entered into ARTLNGP (AQ0110). The selected records are written to an output file which is referred to as an AQDHS-II answer file. The answer file has the same format as the AQDHS-II master file and may be used as input to any AQDHS-II program that uses the master file as input. Refer to Figure 5.2.1-a for a flowchart of the AQDHS-II retrieval function.

The retrieval package provides the user with a great amount of flexibility. He can use the retrieval package to select specific data from the master file (e.g., all sulfur dioxide readings for the year 1976) and then produce a detailed report containing only the selected data, or he can subject the selected data to a statistical analysis. He could also use the retrieval package to modify specific fields on the master file. (Note: The master file would normally be updated or corrected using the programs AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). However, there are instances when a modification could be accomplished easier by using the retrieval programs. An example of this is changing all flags on the master file to 'add'.) The reader will find many examples of retrievals throughout this document, particularly in Sections 5.2.2.5.4, 5.2.3.5.4, and 7.0.

A special use of the retrieval programs is to produce the necessary input file for the sliding average program, ASTSLAV (AQ0180), in order to produce the sliding average report. The retrieval specifications entered into ARTLNGP (AQ0110) must specify that a sliding average retrieval is desired. The file produced by ARTGENR (AQ0120) in this case is referred to as a sliding average answer file and must not be confused with the standard answer file. Refer to Section 5.3.4 for a complete discussion of the production of a sliding average report.

Detailed information on ARTLNGP (AQ0110) and on the retrieval specifications can be found in Section 5.2.2. Detailed information on ARTGENR (AQ0120) can be found in Section 5.2.3.

Three procedures are available for executing the retrieval programs. They are AQRTM10, AQRTM20, and AQRTM30. The procedure AQRTM10 executes ARTLNGP (AQ0110); then compiles, link edits, and executes the generated retrieval program ARTGENR (AQ0120). ARTGENR (AQ0120) is not saved. See Section 5.7 for additional information on AQRTM10.

If the user frequently performs the same retrieval, he should save the load module of the generated retrieval program created by ARTLNGP (AQ0110) for that retrieval. He can then perform the retrieval by executing this load module directly, using the cataloged procedure AQRTM30 (see Section 5.2.3.5). The load module can be created and saved by executing the cataloged procedure AQRTM20 (see Section 5.2.2.5).

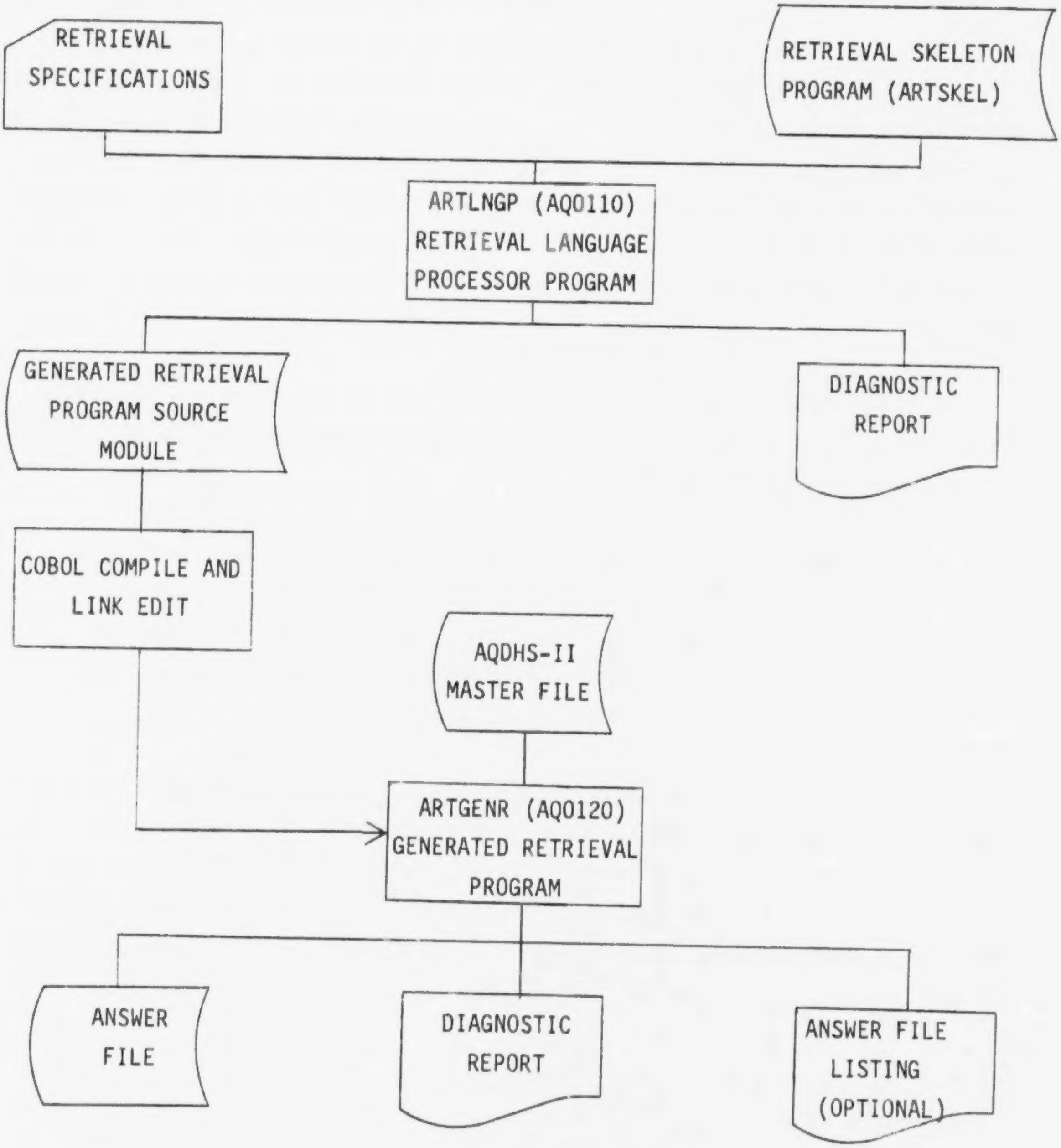
RETRIEVAL SPECIFICATIONS
RETRIEVAL SKELETON PROGRAM (ARTSKEL)
ARTLNGP (AQ0110) RETRIEVAL LANGUAGE PROCESSOR PROGRAM
GENERATED RETRIEVAL PROGRAM SOURCE MODULE
DIAGNOSTIC REPORT
COBOL COMPILE AND LINK EDIT
AQDHS-II MASTER FILE
ARTGENR (AQ0120) GENERATED RETRIEVAL PROGRAM
ANSWER FILE
DIAGNOSTIC REPORT
ANSWER FILE LISTING (OPTIONAL)

Figure 5.2.1-a. Retrieval Flowchart

5.2.2 RETRIEVAL LANGUAGE PROCESSOR PROGRAM - ARTLNGP (AQ0110)

5.2.2.1 Description

ARTLNGP (AQ0110) is the first of two AQDHS-II programs used to retrieve data from the AQDHS-II master file. The generated retrieval program, ARTGENR (AQ0120), must be compiled, link edited, and executed after ARTLNGP (AQ0110) is run to complete the retrieval process.

The retrieval language processor program, ARTLNGP (AQ0110), uses the retrieval skeleton program, ARTSKEL, and user-supplied retrieval specification cards to build a generated retrieval program, ARTGENR (AQ0120). All options and retrieval requirements are contained in the specification cards (see Section 5.2.2.2).

The retrieval requests can be written in either the AQDHS-II retrieval language (see Section 5.2.2.2) or in COBOL. COBOL statements may be included on cards with the execution JCL or stored as copy members in an external source library.

Retrievals may be run in either the standard or the sliding average mode; output answer file records from either mode can be optionally listed. The sliding average answer file is used as input to ASTSLAV (AQ0180), the sliding average program (see Section 5.3.4). A standard answer file may be used as input to any program that can use the AQDHS-II master file as input.

5.2.2.2 File Formats

ARTLNGP (AQ0110) uses two input files: the retrieval skeleton program ARTSKEL, which is stored in a cataloged source library, and the retrieval specification card file. The retrieval specification cards consist of retrieval control cards and retrieval request cards. The control cards indicate the beginning and end of the retrieval specification file, the language the requests are written in, the retrieval mode, and whether or not the LIST option is to be in effect. The control cards also contain the member names required for COBOL retrievals and the name to be assigned to the retrieval load module should the user want to save it. Figure 5.2.2-a illustrates the format of the control cards and Figure 5.2.2-b contains the field definitions.

The retrieval requests precisely identify the data to be retrieved from the master file. The data names that can be used for these requests are listed in Figure 5.2.2-c; each valid data name is defined in Figure 5.2.2-d. The AQDHS-II retrieval language requirements are discussed in Section 5.2.2.2.1; the COBOL requirements in Section 5.2.2.2.2.

Two output files are produced: a temporary file containing the retrieval source program, ARTGENR, and a diagnostic report (see Figure 5.2.2-e).

5.2.2.2.1 AQDHS-II retrieval language - The AQDHS-II retrieval language is designed to allow the user to select records from the AQDHS-II master file based upon the value of specific fields. See Figure 5.2.2-c for a list of those master file fields that can be used in the AQDHS-II retrieval language. The AQDHS-II retrieval language specifications are written in the format described in Figure 5.2.2-f. See Figure 5.2.2-g for the definitions of the fields in these statements.

There are two types of operators used in the AQDHS-II retrieval language: the relational and the Boolean. The relational operator indicates the relationship between a subject name and an object name. That is to say, the relational operator actually asks a question and assigns a truth value (true or false) depending on the answer to that question. The valid relational operators are '=' (equality), '>' (greater than), and '<' (less than). The construction of a relationship is as follows:

'subject name' 'relational operator' object name'.

An easy way to determine the truth value of the relationship is to ask the following question:

Is 'subject name' 'relational operator' 'object name'?

If the answer is 'yes', the truth value of that relationship is true, if the answer is 'no', the truth value is false. Following are examples of relationships and their truth values:

Subject Name	Relational Operator	Object Name	Truth Value
11	=	11	True
11	=	12	False
11	<	12	True
11	<	10	False
11	>	10	True
11	>	12	False

The Boolean operator determines a truth value for a relationship or a set of relationships. The valid Boolean operators are NOT, AND, and OR. The construction of a Boolean expression involving AND or OR is as follows:

'Relationship 1' 'Boolean operator' 'Relationship 2'.

An easy way to determine the truth value of an expression using AND is to ask the question:

Is the truth value of both relationships true?

If the answer is 'yes', the truth value of the expression is true; if the answer is 'no', the truth value is false. An easy way to determine the truth value of a Boolean expression using OR is to ask the question:

Is the truth value of either one of the relationships true?

If the answer is 'yes', the truth value of the expression is true and if the answer is 'no', the truth value is false.

The basic construction of a Boolean expression using NOT is as follows:

'NOT' 'relationship'.

An easy method to determine the truth value of the NOT expression is to reverse the truth value of the relationship; in other words, if the truth value of the relationship is true, then the truth value of the NOT relationship is false and vice-versa. A table of truth values for Boolean expressions is shown in Figure 5.2.2-h.

The use of relationships and Boolean expressions in AQDHS-II retrievals is shown in the following set of examples. The examples will be structured as follows: (1) an assumption concerning the specific data to be retrieved from an existing master or answer file; (2) the AQDHS-II retrieval statements needed to accomplish the request; (3) a brief discussion of how the computer will evaluate the retrieval specifications; (4) a brief discussion of the records which qualify for retrieval. It will be extremely helpful to keep in mind that during a retrieval, the computer is examining only one single record at a time. After that record has been examined, and its qualification for retrieval determined, the following record in the file is then examined.

Example 1

Assume you want to retrieve all of the 1979 data in the master file. The retrieval control statements to accomplish that request are:

Col 1-22	Col 24	Col 26	Col 28-67	Col 69-71
Subject Name	Negation Flag	Relational Operator	Object Name	Boolean Operator
$$SELECT				
YEAR		=	'79'	
$$END				

Each record in the input master file will be individually and sequentially examined, and the question 'is the year equal to 79?' will be asked. Thus, in this retrieval only those records in the master file which have a 79 in the YEAR field will be retrieved.

Example 2

Assume you want to retrieve the records for the month of January, 1979. The retrieval statements for this request are:

Col 1-22	Col 24	Col 26	Col 28-67	Col 69-71
Subject Name	Negation Flag	Relational Operator	Object Name	Boolean Operator
$$SELECT				
YEAR		=	'79'	AND
MONTH		=	'01'	
$$END				

In this retrieval we have a Boolean expression containing two relationships. For each individual record in the master file, the computer evaluates each relationship separately and then evaluates the Boolean expression. Thus, it determines if the YEAR field of the record is 79 and then if the MONTH field is 01. After obtaining the truth value for each relationship, it then evaluates the Boolean expression. If, and only if, the truth value of both relationships is true, then the Boolean expression AND is true and that record will be retrieved.

Example 3

Assume you want to retrieve 1979 data for nitrogen dioxide (42602) and oxides of nitrogen (42603). The retrieval statements to accomplish the request are:

Col 1-22 Subject Name	Col 24 Negation Flag	Col 26 Relational Operator	Col 28-67 Object Name	Col 69-71 Boolean Operator
$$SELECT				
YEAR		=	'79'	AND
PARAMETER-CODE		=	'42602'	OR
YEAR		=	'79'	AND
PARAMETER-CODE		=	'42603'	
$$END				

In this retrieval we have four relationships and two different Boolean operators. The computer now has the problem of which operator to evaluate first. That is, what is the hierarchy of the relational and Boolean operators? If an expression does not contain parentheses, the computer evaluates according to the following hierarchy:

1st (level 1)	All relational operators
2nd (level 1)	Boolean NOT
3rd (level 3)	Boolean AND
4th (level 4)	Boolean OR

If there are operators on the same level, the computer evaluates those operators from left to right (top to bottom).

Therefore, using these rules for evaluating expressions, the computer will determine a truth value for the entire expression for each individual record as follows:

Step	Operation
1	YEAR = '79'
2	PARAMETER-CODE = '42602'
3	YEAR = '79'
4	PARAMETER-CODE = '42603'
5	Result of Step 1 AND result of Step 2
6	Result of Step 3 AND result of Step 4
7	Result of Step 5 OR result of Step 6

Referring to Figure 5.2.2-h, for a record containing oxides of nitrogen for 1979, Step 7 will be evaluated as 'False' OR 'True', which has a value of 'True', and the record will be retrieved. For a record containing nitrogen dioxide for 1979, Step 7 will be evaluated as 'True' OR 'False', which is 'True', and the record will be retrieved. For any other record, Step 7 will be 'False'; thus any record not containing oxides of nitrogen for 1979 or nitrogen dioxide for 1979 will not be retrieved.

NOTE: Step 7 can never be evaluated as 'True' OR 'True' since it is impossible to have an individual record containing both a 42602 (nitrogen dioxide) and 42603 (oxides of nitrogen) in the parameter-code field.

In Example 3, we used the expression YEAR = '79' twice because of the order in which the Boolean operators are evaluated. By using parentheses, we can express the same retrieval with one less statement, as shown in Example 4.

Example 4

Same as Example 3, but this time parentheses will be used. That is, retrieve nitrogen dioxide (42602) and oxides of nitrogen (42603) for 1979. The retrieval statements to accomplish this request are:

Col 1-22 Subject Name	Col 24 Negation Flag	Col 26 Relational Operator	Col 28-67 Object Name	Col 69-71 Boolean Operator
$$SELECT				
YEAR		=	'79'	AND
(PARAMETER-CODE		=	'42602'	OR
PARAMETER-CODE		=	'42603')	
$$END				

In this retrieval, parentheses were used to alter the hierarchy of evaluation of the expression. To evaluate parenthetical expressions the computer will first find the least most inclusive pair (i.e., the inner most pair) of parentheses (see Figure 5.2.2-i) and derive a truth value for that parenthetical expression using the normal method of evaluation. It then proceeds through all sets of parentheses determining the truth value for each set of parentheses. After having evaluated the parenthesized portion of the expression, the nonparenthesized expression is evaluated as we have shown previously. Thus, the computer evaluates this retrieval example as follows:

Step	Operation
1	PARAMETER-CODE = '42602'
2	PARAMETER-CODE = '42603'
3	(Result of Step 1 OR result of Step 2)
4	YEAR = '79'
5	Result of Step 4 AND result of Step 3

Example 5

As an example of the NOT Boolean operator, consider a sliding average retrieval for sulfur dioxide (42401) records for all years 1978 and later. The retrieval statements are:

Col 1-22 Subject Name	Col 24 Negation Flag	Col 26 Relational Operator	Col 28-67 Object Name	Col 69-71 Boolean Operator
$$SELECT		SLIDING		
YEAR	N	<	'78'	AND
PARAMETER-CODE		=	'42401'	
$$END				

The steps for evaluating this retrieval would then be:

Step	Operation
1	YEAR < '78'
2	PARAMETER-CODE = '42401'

3	NOT (Result of Step 1)
4	Result of Step 3 AND result of Step 2

Two fields, STATUS-FLAG and DATA-FIELD, are in the repeating portion of the AQDHS-II master file record. When these fields are used in retrievals, the retrieval expression will be evaluated for each occurence of the repeating field in the record. The entire record will be retrieved if the expression is 'True' for any occurence of the repeating field. The record will not be retrieved if the expression is 'False' for all occurences of the repeating field. Also, for data values, both the data value and the decimal code should be expressed together. Thus, if it is desired to retrieve a value equal to .05, the statement would be DATA-FIELD = '.05'. For negative values, a sample statement would be DATA-FIELD < '-1.015'. Note that it is not necessary (nor is it possible) to specify a decimal code as a subject name. The retrieval programs will automatically take the decimal code of each reading into consideration.

Example 6

Assume a user wants to retrieve all hourly data (TIME-CODE = 1) for TSP (11101) and SO_2 (42401) which had readings greater than the SAROAD maximum allowable readings. Standard units codes are desired for these parameters. For 11101/01, the maximum value is 2000. For 42401/01 the value is 5240. In AQDHS-II, a data reading of '9999' indicates a null-value; we will exclude these from our retrieval. The following statements are used for this retrieval:

Col 1-22 Subject Name	Col 24 Negation Flag	Col 26 Relational Operator	Col 28-67 Object Name	Col 69-71 Boolean Operator
$$SELECT				
TIME-CODE		=	'1'	AND
UNIT-CODE		=	'01'	AND
DATA-FIELD		<	'9999'	AND
(PARAMETER-CODE		=	'11101'	AND
DATA-FIELD		>	'2000'	OR
PARAMETER-CODE		=	'42401'	AND
DATA-FIELD		>	'5240')	

The steps to evaluate this retrieval are:

Step	Operation
1	PARAMETER-CODE = '11101'
2	DATA-FIELD > '2000'
3	PARAMETER-CODE = '42401'
4	DATA-FIELD > '5240'
5	Result of Step 1 AND result of Step 2
6	Result of Step 3 AND result of Step 4
7	Result of Step 5 OR result of Step 6
8	TIME-CODE = '1'
9	UNIT-CODE = '01'
10	DATA-FIELD < '9999'
11	Result of Step 8 AND result of Step 9
12	Result of Step 11 AND result of Step 10
13	Result of Step 12 AND result of Step 7

In this retrieval, a record will be selected if the TIME-CODE field is 1, the UNIT-CODE field is 01, the PARAMETER field is 11101, and any DATA-FIELD is both greater than 2000 and less than 9999; or, if the TIME-CODE field is 1, the UNIT-CODE field is 01, the PARAMETER field is 42401, and any DATA-FIELD is both greater than 5240 and less than 9999.

5.2.2.2.2 COBOL retrievals - In-line COBOL language specifications are entered immediately following the $$SELECT card which has USER coded as the language keyword. These cards are punched according to COBOL rules for syntax and punctuation. Any user-defined paragraph or section name should begin with the prefix USER-to avoid conflict with other names in the program. Any valid PROCEDURE DIVISION statements, with the exception of DECLARATIVES, may be entered. Since the retrieval language processor program does not examine the COBOL statements, any errors could result in COBOL diagnostics or unpredictable results. A data field named SUB (PIC 99 COMP SYNC) is provided for use as a subscript for referencing repeating data names (STATUS-FLAG and DATA-FIELD). The COBOL reserved data name TALLY may be used as an accumulator. All valid data names shown in Figure 5.2.2-c may be used. The RECORD-QUALIFIES-SW is used to indicate whether or not a record is written on the answer file (RECORD-QUALIFIES-SW equal to TRUE). The data names TRUE and FALSE may be used to set RECORD-QUALIFIES-SW.

In a COBOL retrieval where DATA-FIELD is to be compared to a numeric value, the numeric value must not be enclosed in quotation marks. For example, a valid comparison would be:

```
IF DATA-FIELD (1) < 9999
```

while

```
IF DATA-FIELD (1) < '9999'
```

is invalid. Also, in user retrievals, DATA-FIELD only refers to the four-digit reading and does not incorporate the decimal code as is done in AQDHS-II language retrievals.

NOTE: The user is reminded that the above rules are only valid for user-supplied COBOL retrievals (either in-line or copy member).

Any retrieval that can be run using the AQDHS-II retrieval language can also be run using the USER option and COBOL statements, but nothing is gained in these retrievals by using COBOL. However, some retrievals can only be accomplished by using COBOL. Several examples follow to illustrate the advantages of COBOL retrievals.

When running the AQDHS-II language retrievals, each record in the answer file is exactly the same as the corresponding record in the input master file: no changes to the records can be made. In a COBOL retrieval, changes can be made to the answer file records. Example 1 illustrates one common use of this capability.

Example 1

Assume that a user has submitted his 1979 data to SAROAD using program ARPSARD (AQ0220) and that the data were submitted as 'adds'. However, he is required to resubmit the 1979 data for some unforeseen reason. If copies of the SAROAD submittal files were not kept, it will be necessary to re-execute ARPSARD (AQ0200). However, the status flags on the master file indicate that the data has been sent. The following in-line COBOL retrieval will change the RECORD-STATUS-FLAG from S (sent, not anomaly screened) to N (not sent, not screened) or from T (sent, screened) to V (not sent, screened). The STATUS-FLAG for each reading will be changed from S (sent, not screened) to A (add, not screened) or from T (sent, screened) to B (add, screened). The SAROAD transactions can then be generated from the answer file using ARPSARD.

```
$$SELECT USER
        GO TO USER-PARAGRAPH.
      USER-REPEAT.
        IF DATA-FIELD (SUB) IS NOT EQUAL TO 9999
          IF STATUS-FLAG (SUB) IS EQUAL TO 'S' OR
             STATUS-FLAG (SUB) IS EQUAL TO 'C'
            MOVE 'A' TO STATUS-FLAG (SUB)
          ELSE
            IF STATUS-FLAG (SUB) IS EQUAL TO 'T' OR
               STATUS-FLAG (SUB) IS EQUAL TO 'D'
              MOVE 'B' TO STATUS-FLAG (SUB).
        ADD 1 TO SUB.
      USER-REPEAT END.
        EXIT.
      USER-PARAGRAPH.
        MOVE TRUE TO RECORD-QUALIFIES-SW.
        IF YEAR IS EQUAL TO '79'
          MOVE 1 TO SUB
          PERFORM USER-REPEAT THRU USER-REPEAT-END
              NBR-OF-READINGS TIMES
          IF RECORD-STATUS-FLAG IS EQUAL TO 'S'
            MOVE 'N' TO RECORD-STATUS-FLAG
          ELSE
            IF RECORD-STATUS-FLAG IS EQUAL TO 'T'
              MOVE 'V' TO RECORD-STATUS-FLAG.
      USER-PARAGRAPH-END.
        EXIT.
$$END
```

In the above example, all records are written to the answer file (the value true is moved to the RECORD-QUALIFIES-SW before any selection is performed). Then the records are examined to see if the year is equal to

'79'; if so, the record status flag is examined. First, each reading is examined. For non-null readings (those with a value other than 9999), the status flag of the reading is changed from S to A or from T to B to indicate that the reading has been added and not sent to SAROAD; all other status flags are left unchanged. Then the record status flag is examined. If the record status flag is S (meaning the record has been sent to SAROAD, but not all of the readings have been screened), the record status flag is changed to N (the record has not been sent to SAROAD and not all of the readings have been screened). If the value is T (meaning the record has been sent to SAROAD; and all of the readings have been screened), the record status flag is changed to V (all the readings have been screened, but the record has not been sent to SAROAD).

Example 2

A modification of the preceding retrieval would be to change the status flags in the answer file so that all records would be screened by the anomaly screening program. Such a modification is shown in this example.

A COBOL copy member containing the retrieval statements will be created and cataloged prior to running the retrieval. The retrieval will then use this copy member to create an answer file with all records flagged to be screened.

COBOL copy member COPYEXM2

```
     GO TO USER-PARAGRAPH.
 USER-REPEAT.
     IF DATA-FIELD (SUB) NOT EQUAL TO 9999
       IF STATUS-FLAG (SUB) EQUAL TO 'B'
         MOVE 'A' TO STATUS-FLAG (SUB)
       ELSE
```

```
            IF STATUS-FLAG (SUB) EQUAL TO 'D'
              MOVE 'C' TO STATUS-FLAG (SUB)
            ELSE
              IF STATUS-FLAG (SUB) EQUAL TO 'T'
                MOVE 'S' TO STATUS-FLAG (SUB).
        ADD BINARY-1 TO SUB.
      USER-REPEAT-END.
        EXIT.
      USER-PARAGRAPH.
        MOVE TRUE TO RECORD-QUALIFIES-SW.
        MOVE BINARY-1 TO SUB.
        PERFORM USER-REPEAT THRU USER-REPEAT-END
          NBR-OF-READINGS TIMES.
        IF RECORD-STATUS-FLAG EQUAL TO 'T'
          MOVE 'S' TO RECORD-STATUS-FLAG
        ELSE
          IF RECORD-STATUS-FLAG EQUAL TO 'V'
            MOVE 'N' TO RECORD-STATUS-FLAG.
      USER-PARAGRAPH-END. EXIT.
```

The retrieval statements would then be as follows:

```
$$SELECT USER COPYEXM2
$$END
```

In Example 2, all records are written to the answer file. The SAROAD status of each record and reading remains the same, but all of the file is flagged to be screened by the anomaly screening procedure (that is all records in the answer file have record status flags of S or N and reading flags of A, C, or D). The answer file can then be used as input to the anomaly screening procedure AQRPM45 for appropriate anomaly flagging.

Example 3

This example makes use of a member name, a user-defined data member name, and a user-defined subroutine member name. When it is desired to use either user-defined data or a user-defined subroutine, all three fields (member name, user-defined data member name, and user-defined subroutine member name) must be used. In addition, at least one AQDHS-II language specification must be used. This retrieval sample tests data for SO_2 (42401) and determines if the mean value for the record is greater than 1.00 parts per million (units code of 07). This retrieval provides an elementary violation-of-standards technique.

The following copy members must be set up prior to running the retrieval:

RPTEST03:

```
       MOVE FALSE TO RECORD-QUALIFIES-SW.
       IF PARAMETER-CODE EQUAL TO '42401'
           AND UNIT-CODE EQUAL TO '07'
         MOVE ZERO TO USER-TOTAL-READING
                      USER-AVG-READING
                      USER-NBR
         MOVE BINARY-1 TO SUB
         PERFORM USER-CK THRU USER-CK-END NBR-OF-READINGS TIMES
         DIVIDE USER-TOTAL-READING BY USER-NBR
             GIVING USER-AVG-READING
         IF USER-AVG-READING IS GREATER THAN 1
           MOVE TRUE TO RECORD-QUALIFIES-SW.
```

DTTEST03

```
     01  USER-DATA-STRUCTURE.
         02  USER-TOTAL-READING  PIC S9(5)V9(4) VALUE +0.
         02  USER-AVG-READING    PIC S9(5)V9(4) VALUE +0.
```

```
        02  USER-NBR             PIC 99 VALUE 0.
        02  USER-DATA-FLD        PIC S9(4).
        02  USER-DATA-FLD0       REDEFINES
            USER-DATA-FLD        PIC S9(4).
        02  USER-DATA-FLD1       REDEFINES
            USER-DATA-FLD        PIC S999V9.
        02  USER-DATA-FLD2       REDEFINES
            USER-DATA-FLD        PIC S99V99.
        02  USER-DATA-FLD3       REDEFINES
            USER-DATA-FLD        PIC S9V999.
        02  USER-DATA-FLD4       REDEFINES
            USER-DATA-FLD        PIC SV9999.
        02  USER-DATA-FLDX       PIC S9(4)V9(4).
```

<u>RPTEST3A</u>:

```
    USER-CK.
      MOVE DATA-FIELD (SUB) TO USER-DATA-FLD.
      IF DECIMAL-CODE (SUB) EQUAL TO 0
        MOVE USER-DATA-FLD0 TO USER-DATA-FLDX
      ELSE
        IF DECIMAL-CODE (SUB) EQUAL TO 1
          MOVE USER-DATA-FLD1 TO USER-DATA-FLDX
        ELSE
          IF DECIMAL-CODE (SUB) EQUAL TO 2
            MOVE USER-DATA-FLD2 TO USER-DATA-FLDX
          ELSE
            IF DECIMAL-CODE (SUB) EQUAL TO 3
              MOVE USER-DATA-FLD3 TO USER-DATA-FLDX
            ELSE
              MOVE USER-DATA-FLD4 TO USER-DATA-FLDX.
    IF USER-DATA-FLDX IS LESS THAN 9998
      ADD 1 TO USER-NBR
```

```
          ADD USER-DATA-FLDX TO USER-TOTAL-READING.
        ADD 1 TO SUB.
      USER-CK-END.  EXIT.
```

The following retrieval specifications are used.

```
$$SELECT      RPTEST03                  DTTEST03 RPTEST3A
YEAR                    = YEAR
$$END
```

The AQDHS-II retrieval statement 'YEAR=YEAR' serves only to fulfill the requirements for using the specified copy members.

5.2.2.2.3 Batched retrievals - Up to twenty retrievals can be run in one execution of the retrieval procedure. Such retrievals are said to be 'batched'. Only AQDHS-II language retrievals using the standard mode (i.e., not sliding average) may be batched. When batching retrievals, each retrieval begins with a $$SELECT card. Only the first $$SELECT card can contain options (LIST and the generated load module name are the only valid options for batched retrievals). One $$END card occurs at the end of all the retrievals.

The output answer file will contain all retrieved records. Each record in the answer file will contain a letter, A-T, in the first position of the record to indicate which retrieval selected the record. If a given record is selected by more than one retrieval, it will appear once in the answer file for each retrieval that selected it. The master file sort program ASRMSTR (AQ0140) must be run using the BATCH option to sort the answer file so that each retrieval's answer records are grouped together. Once the answer file has been sorted, it may be used as input to any of the report programs. A batched answer file should never be used in place of an AQDHS-II master file in any procedures except those that produce reports, since the batched answer file may contain duplicate records (that is, if a record satisfies more than one of the batched retrievals, a copy of the record will be on the answer file for each retrieval that it satisfied).

The following example makes use of batched retrievals:

Example 1

Assume a user wants a detailed listing of first quarter 1979 data for TSP, SO_2 and NO_X. He is interested only in hourly data for TSP, daily data for SO_2, and all NO_x data. For his report, he wants each parameter printed separately, although some sites monitor more than one of these parameters. The following retrieval statements will be used:

Col 1-22 Subject Name	Col 24 Negation Flag	Col 26 Relational Operator	Col 28-67 Object Name	Col 69-71 Boolean Operator
$$SELECT				
YEAR		=	'79'	AND
MONTH		<	'04'	AND
PARAMETER-CODE		=	'11101'	AND
TIME-CODE		=	'1'	
$$SELECT				
YEAR		=	'79'	AND
MONTH		<	'04'	AND
PARAMETER-CODE		=	'42401'	AND
TIME-CODE		=	'8'	
$$SELECT				
YEAR		=	'79'	AND
MONTH		<	'04'	AND
PARAMETER-CODE		=	'42603'	
$$END				

The answer file produced by this retrieval must be sorted by ASRMSTR (AQ0140) using the BATCH option. The sorted answer file would then be used as input to ARPMSTR (AQ0230) to produce the desired detailed report.

5.2.2.3 Options

The options allowed for ARTLNGP (AQ0110) are specified on the $$SELECT retrieval control card. Information on this card can be found in Figure 5.2.2-a and Figure 5.2.2-b. Figure 5.2.2-j lists possible combinations of the options for different types of retrievals.

5.2.2.4 Error Messages

ARTLNGP 001 CONDITIONAL - $$END CARD MISSING

Meaning: The last card for the retrieval specifications must be a $$END. If this card is missing, the error message will be printed, but program execution will continue.

Action: No action required unless other errors have been detected.

ARTLNGP 002 ABORT - FIRST CONTROL CARD NOT $$SELECT

Meaning: The first control card for specifying a retrieval must be a $$SELECT card. If this card is not present, the run is aborted.

Action: Include the $$SELECT card and resubmit the job.

ARTLNGP 003 ABORT - DATA NAME INVALID 'identifier'

Meaning: Subject and object names (identifiers) must be spelled exactly, including the hyphen, as spelled in the valid retrieval data names, Figure 5.2.2-c. The program execution was prematurely terminated.

Action: Correct the subject or object name (indicated by the identifier in the error message) and resubmit the job.

ARTLNGP 004 ABORT - NO CONTROL CARDS IN INPUT STREAM

Meaning: There must be at least a $$SELECT and a $$END card in the input run stream. The run was aborted.

Action: Include control cards as shown in 5.2.2.5.4 and resubmit the job.

ARTLNGP 005 ABORT - INVALID NEGATION CHARACTER

Meaning: The character N should be used as the negation flag; otherwise, the negation flag field should be blank. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 006 ABORT - INVALID RELATIONAL OPERATOR

Meaning: The only valid relational operators are = denoting equal to, > denoting greater than, and < denoting less than; any other symbol will be rejected. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 007 ABORT - INVALID BOOLEAN OPERATOR

Meaning: The valid Boolean operators are AND and OR. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 008 ABORT - $$SELECT OR $$END CARD EXPECTED BUT NOT FOUND

Meaning: An AQDHS-II retrieval language card with no Boolean operator was followed by another retrieval language card. Since only the last card in a retrieval may have no Boolean operator, the run was aborted.

Action: Correct the retrieval and resubmit the job.

ARTLNGP 009 ABORT - RETRIEVAL LANGUAGE CARD EXPECTED BUT NOT FOUND

Meaning: The last AQDHS-II retrieval language card in a retrieval had a Boolean operator with no matching relationship. The last

retrieval language card in a retrieval must not contain a Boolean operator; therefore, the run was aborted.
Action: Correct the retrieval and resubmit the job.

ARTLNGP 010 ABORT - NUMBER OF RETRIEVALS EXCEEDS BATCH LIMIT
Meaning: More than twenty retrievals have been batched in one run; therefore, the run was aborted.
Action: Resubmit the job with no more than twenty retrievals batched in one run.

ARTLNGP 011 ERROR - ALL STATEMENTS AFTER $$END CARD ARE IGNORED
Meaning: Cards have been found after the $$END card; these are ignored.
Action: None, if the cards after the $$END card can be ignored with no significant change in the result of the retrieval; otherwise, correct the retrieval and resubmit.

ARTLNGP 012 ABORT - MORE THAN ONE RETRIEVAL IN USER-WRITTEN COBOL RUN
Meaning: With the USER option specifying COBOL language statements, only one retrieval ($$SELECT card) is allowed per run. The run was aborted.
Action: Delete the additional retrievals and resubmit the job.

ARTLNGP 013 ABORT - MORE THAN ONE RETRIEVAL IN SLIDING AVERAGE RUN
Meaning: The SLIDING option on the first $$SELECT card will allow only one retrival to be processed. The run was aborted.
Action: Delete the additional retrievals and resubmit the job.

ARTLNGP 014 ABORT - ONLY THE FIRST $$SELECT CARD CAN SPECIFY OPTIONS
Meaning: Only the first $$SELECT card can specify options. Columns nine through 72 of all subsequent $$SELECT cards must be blank; therefore, the run was aborted.
Action: Correct the retrieval and resubmit the job.

ARTLNGP 015 CONDITIONAL - INVALID PROGRAM NAME, USING ARTDFLT

Meaning: The name of the generated load module on the $$SELECT card be seven characters or less; the first character must be alphabetic, and the remaining characters must be alphabetic or numeric. No spaces are allowed. If the name is found to be invalid, the name 'ARTDFLT' is used.

Action: No action is needed if the program name ARTDFLT is acceptable.

ARTLNGP 016 ABORT - INVALID $$SELECT CARD

Meaning: Invalid options appear on the $$SELECT card or an invalid combination of options appear on the $$SELECT card. The run was aborted.

Action: Refer to Figures 5.2.2-a, 5.2.2-b, and 5.2.2-j for valid options and combinations of options. Correct the $$SELECT card and resubmit the run.

5.2.2.5 Cataloged JCL

The cataloged procedure AQRTM20 which is discussed below, executes the retrieval language processor program, ARTLNGP (AQ0110), then compiles and link edits the generated retrieval program, ARTGENR (AQ0120), and stores the resulting load module. The cataloged procedure AQRTM30 is used to execute the stored load module and produce an answer file. See Section 5.2.3.5 for information on AQRTM30.

The cataloged procedure AQRTM10 executes the retrieval language processor program, then compiles, link edits, and executes the generated retrieval program. The corresponding load module is not saved. See Section 5.7.1 for information on AQRTM10.

5.2.2.5.1 JCL listing - Figure 5.2.2-k contains a listing of the cataloged procedure AQRTM20.

5.2.2.5.2 Cross-reference of DD names and files

Program Name: ARTLNGP (AQ0110)

DD Name	File Description	Input/Output
AQSINPGM	Retrieval skeleton program	Input
AQSINPUT	Retrieval specification cards	Input
AQSRTRVR	Generated retrieval source program	Output
AQSPRINT	Diagnostic report	Output

5.2.2.5.3 User-supplied JCL - To execute the cataloged procedure AQRTM20, the user can expect to supply job accounting information and the name for the generated retrieval program to be stored. See Figure 5.2.2-1 for a description of the procedure's substitutable parameters.

5.2.2.5.4 Sample run stream - The following run stream uses procedure AQRTM20 to create the retrieval load module ARTGEN1. This retrieval module can then be executed using the procedure AQRTM30; see Section 5.2.3.5.4 for that run stream. The AQDHS-II retrieval specifications entered indicate that the retrieval will be for state 12 and site 001. This run stream is from the AQDHS-II baseline test run series.

```
//  EXEC   AQRTM20,
//         PGMSAVE=ARTGEN1
//COMPILE.INPUT DD *
$$SELECT                                                     ARTGEN1
STATE                   = '12'                                       AND
SITE                    = '001'
$$END
/*
```

5.2.2.6 Warnings and Special Instructions

The retrieval language processor program, ARTLNGP (AQ0110), edits the retrieval specification control cards and the AQDHS-II retrieval language cards, but does not edit user-written COBOL retrieval statements.

Both cataloged procedures AQRTM10 and AQRTM20 execute the COBOL compiler after ARTLNGP (AQ0110) to compile the generated retrieval source program. During the compilation of the generated retrieval source program, errors may be encountered that were not detected by ARTLNGP (AQ0110). For example, unmatched parentheses in AQDHS-II retrieval language cards will not be detected by ARTLNGP (AQ0110) but will cause errors when the COBOL compiler is executed. Also, errors in the user-written COBOL retrieval statements will be detected by the COBOL compiler. Thus, when executing procedure AQRTM10 or AQRTM20, error messages may be generated by the COBOL compiler. When this occurs, the user should examine the retrieval specification cards for errors. If no errors can be found, the user should contact NADB for assistance.

General rules for retrieval specification control cards are presented below:

> Only the first $$SELECT card is edited for special option fields. When coded, these optional fields must occur in exactly the columns specified, must be spelled exactly as stated (see Figure 5.2.2-a and Figure 5.2.2-b), and must reflect a valid combination of options (see Figure 5.2.2-j).

> When batching retrievals, each retrieval is preceded by a $$SELECT card. Batched retrievals may only use the AQDHS-II language specifications. No $$SELECT card except the first may contain optional fields. Twenty batches are allowed.

A $$END card must be the last card in the specification. If any other cards follow the $$END card, they will be ignored.

For AQDHS-II language specifications, the following rules apply:

Names must be spelled exactly as shown in Figure 5.2.2-c.

All literals should be enclosed in quotes, and should be the same length as that specified in Figure 5.2.2-d for the compared field.

When specifying values for DATA-FIELD in AQDHS-II language retrievals, remember that the data value is combined with the decimal code; that is, a value of '1023' with decimal code of two should be specified as '10.23', and '-258' with decimal code of three is '-.258'.

If any repeating field satisfies the retrieval criteria, the entire record qualifies for retrieval.

COBOL retrieval statements are not edited by ARTLNGP (AQ0110). COBOL statements should follow ANS COBOL specifications. In COBOL statements, the name DATA-FIELD refers only to the value contained in that field: DECIMAL-CODE must be specified separately.

When COBOL copy members are used, they must be created and stored prior to running the retrieval procedure.

The user-defined data and subroutine fields of the $$SELECT card must be used in conjunction with a COBOL copy member and an AQDHS-II retrieval language statement.

Sliding average answer files are for use with the sliding average program ASTSLAV (AQ0180) only. Information on this program can be found in Section 5.3.4.

All records retrieved from a batched retrieval are written to the same answer file. The master file sort program ASRMSTR (AQ0140) must be run using the BATCH option to sort the records by batch numbers. This sorted file can then be used as input to any of the report programs. See Section 5.6 for information on ASRMSTR (AQ0140).

All null-value readings (value 9999) have a decimal code of 0. Care must be taken to insure that null values are not retrieved by mistake. Thus, if it is desired to retrieve values greater than '1050', the statements

```
     DATA-FIELD > '1050'       AND
     DATA-FIELD N = '9999'
```

should be used.

When ARTLNGP (AQ0110) is run and encounters an abort error, the generated retrieval source program, ARTGENR (AQ0120), will contain statements that will cause compilation errors. Thus, the generated retrieval load module will not be produced nor executed. When an abort occurs, correct the error encountered by ARTLNGP (AQ0110) and resubmit the job.

The language processor program ARTLNGP (AQ0110) must always be run prior to running the generated retrieval program ARTGENR (AQ0120). The two programs may be run together using the cataloged procedure AQRTM10 or the generated retrieval module may be stored using the cataloged procedure AQRTM20 and run later using the cataloged procedure AQRTM30.

When specifying a generated load module name during a run using cataloged procedure AQRTM20, the load module name must be specified on the $$SELECT card in the retrieval specifications and as the value of the substitutable parameter PGMSAVE in the user-supplied JCL. If no load module is specified on the $$SELECT card, the value ARTGENR should be specified for the substitutable parameter PGMSAVE.

5.2.2.7 Cost Considerations

The following example provides an estimate of the cost of executing ARTLNGP (AQ0110) and then compiling and link editing ARTGENR (AQ0120) using the cataloged procedure AQRTM20. AQRTM20 was executed on an IBM 370/168 for this example.

Size of skeleton program:	1,097 records
Number of retrieval specifications:	4 records
Size of generated program:	1,122 records
CPU time:	4.2 seconds
I/O time:	27.8 seconds
Total time:	37.4 seconds
Estimated cost:	$5.85

5.2.2.8 Related Programs and Procedures

ARTLNGP (AQ0110) must always be executed in conjunction with ARTGENR (AQ0120). The procedure AQRTM10 executes both of these programs, while AQRTM20 executes ARTLNGP (AQ0110) and AQRTM30 executes ARTGENR (AQ0120).

Record Position	Field Length	Description
1 - 8	8	Card type
9	1	Unused
10 - 13	4	Language keyword
14 - 15	2	Unused
16 - 23	8	COBOL member name
24	1	Unused
25 - 32	8	Mode keyword
33	1	Unused
34 - 39	6	List option
40 - 42	3	Unused
43 - 50	8	User-defined data member name
51	1	Unused
52 - 59	8	User-defined subroutine member name
60	1	Unused
61 - 67	7	Generated load module name
68 - 72	5	Unused
73 - 80	8	Sequence number

Figure 5.2.2-a. AQDHS-II Retrieval Control Card

Card Type: Identifies the type of control card.

Valid Codes: $$SELECT - Specifies the beginning of a retrieval request.

$$END - Specifies the end of a retrieval request and must appear alone on the card.

Field Length: 8 characters.

Language Keyword: Identifies the type of retrieval language to be used.

Valid Code: USER - Retrieval specifications will be COBOL language statements.

blank - Indicates that AQDHS-II retrieval language specifications will be used.

Field Length: 4 characters.

COBOL Member Name: Indicates the name of a COBOL copy member residing in a partitioned data set and containing COBOL language statements. A copy member can be used for USER retrievals or in conjunction with a user-defined data member and user-defined subroutine member.

Valid Code: blank - Specifies that the COBOL retrieval statements will be placed after the $$SELECT card.

member name - Specifies the name of the member of an external source library where the COBOL retrieval statements reside. These COBOL statements must have been stored in the external source library under this member name prior to the execution of the retrieval.

Field Length: 8 characters.

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Figure 5.2.2-b. Definition of AQDHS-II Retrieval Control Card Fields

Mode Keyword: Identifies the retrieval mode.

Valid Codes: blank - Standard answer file is to be created.

SLIDING - Sliding average answer file is to be created. The sliding average answer file contains additional records to those meeting the retrieval specifications. These records provide the wraparound capability for calculating sliding averages. The sliding average program ASTSLAV (AQ0180) is described in Section 5.3.4.

Field Length: 8 characters.

List Option: Identifies whether or not the retrieved records are to be printed.

Valid Codes: LIST - print all retrieved records.

NOLIST - Print no records.

blank - Print no records.

Field Length: 6 characters.

User-Defined Data Member Name: Identifies the name of a member in an external source library containing a COBOL 01-level data structure. This data member is used to define variables for user-defined subroutines, and it must be used in conjunction with a COBOL member, user-defined subroutines, and AQDHS-II retrieval language specifications.

Valid Codes: blank - No user-defined data will be used.

member name - The member of an external source library which is to be copied into the working-storage section and assigned the label, 01

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Figure 5.2.2-b - Continued. Definition of AQDHS-II Retrieval Control Card Fields

USER-DATA-STRUCTURE, when the retrieval program is generated.

Field Length: 8 characters.

User-Defined Subroutine Member Name: Identifies the name of a member in an external source library containing a user-defined subroutine. The user-defined subroutine can be invoked only by the user-written COBOL statements defined in the COBOL member (columns 16-23). The user-defined subroutine must be a closed subroutine; i.e., it cannot call any other subroutines. This option must be used in conjunction with a user-defined data member name, a COBOL member name and AQDHS-II retrieval language specifications.

Valid Codes: blank - No user-defined subroutine will be used.

member name - The name of the member of an external source library which contains the subroutine to be copied.

Field Length: 8 characters.

Generated Load Module Name: Specifies the user-defined load module name when the procedure AQRTM20 is used to create and store the load module of a generated retrieval program. When this field is used, the name specified must also be used for the substitutable parameter, PGMSAVE, in the job stream for procedure AQRTM20.

Valid Code: blank - The name ARTGENR will be used for the generated load module.

load module name - Must be seven characters or less consisting of the letters A-Z and the digits 0-9 and beginning with a letter.

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Figure 5.2.2-b - Continued. Definition of AQDHS-II Retrieval Control Card Fields

Field Length: 7 characters.

Sequence Number: An optional entry to allow the retrieval specification cards to be numbered sequentially. No sequence checking is performed by ARTLNGP (AQ0110).

Field Length: 8 characters.

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Figure 5.2.2-b - Continued. Definition of AQDHS-II Retrieval Control Card Fields

Data Names for AQDHS-II and COBOL Language Retrievals

Data Name	Field Length	Data Name	Field Length
ACTION-CODE	1	KEY-3	6
AGENCY	1	METHOD-CODE	2
AQCR	3	MONTH	2
AREA-CODE	4	NBR-OF-READINGS	2
COMPOSITE-KEY-3	6	PARAMETER-CODE	5
COMPOSITE-PERIOD	2	PROJECT	2
COMPOSITE-SAMPLES	2	RECORD-STATUS-FLAG	1
COMPOSITE-TIME-CODE	1	SITE	3
COMPOSITE-TYPE	1	SLAMS-ID	1
COUNTY-CODE	4	START-HOUR	2
DATA-FIELD*	See Figure 5.2.2-d	STATE	2
DAY-CODE	2	STATUS-FLAG*	1
FORM-CODE	1	TIME-CODE	1
IDENT-KEY	37	UNIT-CODE	2
KEY-1	22	YEAR	2
KEY-2	9		

Data Names for COBOL Language Retrievals Only

Data Name	Field Length
DECIMAL-CODE*	1
KEY-1-A	20
RPTING-SECTION*	6

---

*Repeating data names.

Figure 5.2.2-c. Valid Retrieval Data Names

ACTION-CODE: Indicates the last action performed on the master file record.
Valid Codes: 2 - Add
3 - Change
Field Length: 1 character.

AGENCY: Identifies the agency responsible for the sampling site.
Valid Codes: See Appendix A, Table 1.
Field Length: 1 character.

AQCR: Identifies the AQCR (Air Quality Control Region) in which the sampling site is located.
Valid Codes: 001-247
Field Length: 3 characters.

AREA-CODE: Identifies the geographical area in which the sampling site is located.
Valid Codes: Contact the EPA Regional Office for the valid codes.
Field Length: 4 characters.

COMPOSITE-KEY-3: Identifies, as a group the following fields:
COMPOSITE-PERIOD
COMPOSITE-SAMPLES
COMPOSITE-TYPE
COMPOSITE-TIME-CODE
Field Length: 6 characters.

COMPOSITE-PERIOD: Identifies the period during which the composite sample was taken.

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Figure 5.2.2-d. Definition of Retrieval Data Names

Valid Codes:	01 - 04	Quarterly and Seasonal Composite
	01 - 12	Monthly Composite
	01 - 52	Weekly Composite
	00	Annual Composite

Field Length: 2 characters.

COMPOSITE-SAMPLES: Indicates the number of individual samples that were composited.

Field Length: 2 characters.

COMPOSITE-TIME-CODE: Indicates the interval at which the individual composited samples were taken.

Valid Codes: SAROAD time codes are used; see Appendix A, Table 3. The only valid composite time codes are 1-9, A, and B.

Field Length: 1 character.

COMPOSITE-TYPE: Indicates the interval for which the samples were composited.

Valid Codes: 1 - Quarterly Composite
2 - Seasonal Composite
3 - Monthly Composite
4 - Weekly Composite
5 - Annual Composite

Field Length: 1 character.

COUNTY-CODE: Identifies the county in which the sampling site is located.

Field Length: 4 characters.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

*DATA-FIELD: The value of the sample taken.

Valid Codes: When DATA-FIELD is used in COBOL retrievals, it only refers to the four-digit reading and does not incorporate the decimal code; however, when DATA-FIELD is used in AQDHS-II Retrieval Language, it refers to the value of the sample, taking into account the decimal code. When DATA-FIELD is used as the subject name in an AQDHS-II language retrieval, the object name may be DATA-FIELD or any numeric literal within apostrophes, positive or negative, with or without a decimal point.

DAY-CODE: The day of the month on which the sample was taken.

Field Length: 2 characters.

*DECIMAL-CODE (COBOL Language Only): Indicates the position of an assumed decimal within the four-character reading in the master file record.

Valid Codes: 0, 1, 2, 3, 4

Field Length: 1 character.

FORM-CODE: Indicates which transaction format was used to create the master file record.

Valid Codes: 1 - Form 1
2 - Form 2
3 - Form 3

Field Length: 1 character.

---

*A repeating field.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

IDENT-KEY: Identifies, as a group, the following fields:

KEY-1
KEY-2
KEY-3

Field Length: 37 characters.

KEY-1: Identifies, as a group, the following fields:

STATE
AQCR
COUNTY-CODE
AREA-CODE
SITE
AGENCY
PROJECT-CODE
TIME-CODE
YEAR

Field Length: 22 characters.

KEY-1-A (COBOL Language Only): Identifies, as a group, the following fields:

STATE
AQCR
COUNTY-CODE
AREA-CODE
SITE
AGENCY
PROJECT
TIME-CODE

Field Length: 20 characters.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

KEY-2: Identifies, as a group, the following fields:

PARAMETER-CODE
METHOD-CODE
UNIT-CODE

Field Length: 9 characters.

KEY-3: Identifies, as a group, the following fields:

MONTH
DAY-CODE
START-HOUR

Field Length: 6 characters.

METHOD-CODE: Identifies both the collection method and the analysis method for the parameter being measured.

Field Length: 2 characters.

MONTH: The month of the year during which the sample was taken.

Field Length: 2 characters.

NBR-OF-READINGS: Indicates the number of readings or samples contained in the master file record.

Field Length: 2 characters.

PARAMETER-CODE: Identifies the parameter being measured.

Valid Codes: Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a full list of currently accepted parameter codes.

Field Length: 5 characters.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

PROJECT: Identifies the project in association with which the sample was taken.

Valid Codes: See Appendix A, Table 2.

Field Length: 2 characters.

RECORD-STATUS-FLAG: Indicates the SAROAD submission status and anomaly screening status of the record.

Valid Codes:
- S All readings in the record have been submitted to SAROAD, but one or more non-null readings have not undergone anomaly screening.
- T All readings in the record have been submitted to SAROAD and all non-null readings have undergone anomaly screening.
- N One or more readings in the record have not been submitted to SAROAD, and one or more non-null readings have not undergone anomaly screening.
- V One or more readings in the record have not been submitted to SAROAD, but all non-null readings have undergone anomaly screening.
- X Record has been flagged for deletion, all readings are null.

Field Length: 1 character.

*RPTING-SECTION (COBOL Language Only): Identifies, as a group, the following fields:

STATUS-FLAG
DECIMAL-CODE
DATA-FIELD

Field Length: 6 characters.

---

*A repeating field.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

SITE: Identifies the site at which the sample was taken.
Field Length: 3 characters.

SLAMS-ID: Indicates whether the sampling site is a State and Local Air Monitoring Station (SLAMS) or a National Air Monitoring Station (NAMS) associated with the site.
Field Length: 1 character.

START-HOUR: The hour at which the first sample was taken.
Valid Codes: See Appendix A, Table 3.
Field Length: 2 characters.

STATE: Indicates the state (or other geographic division) in which the sampling site is located.
Field Length: 2 characters.

*STATUS-FLAG: Indicates the status of the reading.
Valid Codes:

A	Reading has been added since submission to SAROAD and has not undergone anomaly screening.
C	Reading has been changed since submission to SAROAD and has not undergone anomaly screening.
S	Reading has been submitted to SAROAD but has not undergone anomaly screening.
B	Reading has been added since submission to SAROAD and has undergone anomaly screening.
D	Reading has been changed since submission to SAROAD and has undergone anomaly screening.

---

*A repeating field.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

T Reading has been submitted to SAROAD and has undergone anomaly screening.

Field Length: 1 character.

TIME-CODE: Indicates the interval at which the samples were taken.

Valid Codes: See Appendix A, Table 3.

Field Length: 1 character.

UNIT-CODE: Indicates the units in which the parameter was measured.

Valid Codes: See Appendix A, Table 4 for a partial list and the AEROS MANUAL SERIES, Volume V: AEROS Manual of Codes for a complete list of currently accepted units codes.

Field Length: 2 characters.

YEAR: The year in which the sample was taken.

Field Length: 2 characters.

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Figure 5.2.2-d - Continued. Definition of Retrieval Data Names

```
                    AQDHS-II RETRIEVAL LANGUAGE PROCESSOR PROGRAM  -  DIAGNOSTIC REPORT                       PAGE    1
PROGRAM NAME: ARTLNGP (AQ0110)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

INPUT (CONTROL CARDS):

$$SELECT
YEAR                       = '79'                            AND
MONTH                      = '01'                            OR
YEAR                       = '73'
$$END

NUMBER UF CONTRUL CARDS READ:                     5
NUHBER UF RETRIEVAL SKELETON RECURDS READ:    1,147
NUMBER OF RETRIEVAL SOURCE RECORDS WRITTEN:   1,192
NUMBER OF CONDITIONAL MESSAGES:                   0
NUMBER OF ERROR MESSAGES:                         0
NUMHER OF ABORT MESSAGES:                         0
```

Figure 5.2.2-e. Diagnostic Report

Record Position	Field Length	Description
1 - 22	22	Subject name
23	1	Unused
24	1	Negation flag
25	1	Unused
26	1	Relational operator
27	1	Unused
28 - 67	40	Object name
68	1	Unused
69 - 71	3	Boolean operator
72 - 80	9	Unused

Figure 5.2.2-f. AQDHS-II Retrieval Language Specifications

Subject Name: Specifies the name of the field in the AQDHS-II master file record to be compared with the literal or the master file field name specified by the object name.

Valid Codes: Only those fields listed in Figure 5.2.2-c can be used. The spelling, including hyphen, must match exactly.

Field Length: 22 characters.

Negation Flag: Indicates whether the Boolean NOT condition is in effect.

Valid Codes: N - Boolean NOT is in effect.
space - Boolean NOT is not in effect.

Field Length: 1 character.

Relational Operator: Indicates the relationship to be tested between the subject name and the object name.

Valid Codes: = equal
< less than
> greater than

Field Length: 1 character.

Object Name: A literal to be compared against the master file field specified by the subject name, or the name of a master file field to be compared against the master file field specified by the subject name (e.g., subject name = object name).

Valid Codes: If a literal is used, it must be enclosed in apostrophes. The length of the literal must be exactly the same as the field length of the data name being compared (see Figure 5.2.2-d). If the name of a field from the master file is used, it must match exactly one of the names listed in

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Figure 5.2.2-g. Definition of AQDHS-II Retrieval Language Specification Fields

Figure 5.2.2-c. However, it must not be enclosed in apostrophes.

Field Length: 40 characters.

Boolean Operator: Identifies the type of connector used between the relationship specified on this control card and that specified on the next card.

Valid Codes: AND - Indicates that both relationships must be true in order for the entire relationship to be true.

OR - Indicates that if either relationship is true, the entire relationship is true.

blank - Indicates that there is no connector, and therefore, that there is no further specification.

Field Length: 3 characters.

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Figure 5.2.2-g - Continued. Definition of AQDHS-II Retrieval Language Specification Fields

Truth Value of Relationship #1	Truth Value of Relationship #2	Truth Value of Relationship #1 AND Relationship #2
False	False	False
False	True	False
True	False	False
True	True	True

Truth Value of Relationship #1	Truth Value of Relationship #2	Truth Value of Relationship #1 OR Relationship #2
False	False	False
False	True	True
True	False	True
True	True	True

Truth Value of Relationship	Truth Value
True	False
False	True

Figure 5.2.2-h. Truth Values for Boolean Expressions

(((A) B) C)

The least inclusive pair of parentheses is the pair around the letter A, the second least inclusive set includes the letters A and B, and the most inclusive set in this example includes letters A, B, and C. Thus, the order of evaluation is from A to B to C.

(((A) B) ((C) D) E)

In this set both A and C have the least most inclusive pair; therefore, the order of operation is left to right on the same level of parentheses. That is, the order of operation in the above example is from A to C to B to D to E.

Figure 5.2.2-i. Examples of Parenthetical Expressions

Type of Retrieval	Option Fields on $$SELECT Card								
	Card Type	Language Keyword	COBOL Member Name	Mode Keyword	List Option	User-defined Data Member Name	User-defined Subroutine Member Name	Generated Load Module Name	Batching of Retrievals Allowed
AQDHS-II Retrieval Language	R	N	N	O	O	N	N	O	*
COBOL retrieval with COBOL statements in retrieval specification card file	R	R	N	O	O	N	N	O	N
COBOL retrieval with COBOL statements in COBOL copy member	R	R	R	O	O	N	N	O	N
COBOL retrieval with COBOL statements in COBOL copy member which uses user-defined data definitions and user-defined subroutine	R	N	R	O	O	R	R	O	N

N	Not allowed
O	Option
R	Required
*	If the mode keyword is blank (standard retrieval), batching of retrievals is allowed. If the mode keyword is SLIDING (sliding average retrieval), batching of retrievals is not allowed.

Figure 5.2.2-j. Retrieval Options

```
//*
//*    PROCEDURE NAME: AQRTM20
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO CREATE AN AQDHS-II GENERATED
//*    RETRIEVAL PROGRAM AND THEN COMPILE THE LINK-EDIT THE PROGRAM
//*
//*
//AQRTM20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARTLNGP,
//             TEMP=SYSDA,
//             PGMSAVE=ARTDFLT,
//             MEMBER=ARTSKEL,
//             OUT=A
//*
//COMPILE EXEC PGM=&PROGRAM,
//             REGION=70K,
//             TIME=(1,0)
//*
//* PRODUCE AQDHS-II RETRIEVAL PROGRAM
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - RETRIEVAL PROGRAM SKELETON
//*
//AQSINPGM  DD DSNAME=&PROJECT..SOURCE(&MEMBER),
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - RETRIEVAL SPECIFICATION CARDS
//*
//AQSINPUT  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - GENERATED RETRIEVAL PROGRAM
//*
//AQSRTRVR  DD UNIT=&TEMP,
//             DISP=(NEW,PASS),
//             SPACE=(TRK,(5,2),RLSE),
//             DSNAME=&&PROGRAM,
//             DCB=BLKSIZE=3360
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
```

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Figure 5.2.2-k. Cataloged Procedure AQRTM20

```
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//COBOL   EXEC PGM=IKFCBL00,
//  PARM='NOSEQ,NOSOURCE,SUPMAP,LIB,SIZE=114K,BUF=30K,STATE,FLOW=10',
//             REGION=200K,
//             TIME=(2,0)
//*
//* COMPILE RETRIEVAL PROGRAM
//*
//*
//* INPUT DATA SET - SOURCE LIBRARY
//*
//SYSLIB     DD DSNAME=&PROJECT..SOURCE,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - COBOL RETRIEVAL PROGRAM SOURCE CODE
//*
//SYSIN      DD DSNAME=&&PROGRAM,
//              DISP=(OLD,DELETE)
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - COBOL RETRIEVAL PROGRAM OBJECT CODE
//*
//SYSLIN     DD UNIT=&TEMP,
//              DISP=(NEW,PASS),
//              SPACE=(TRK,(5,2),RLSE),
//              DSNAME=&&OBJMOD
//*
//* UTILITY DATA SETS
//*
//SYSUT1     DD UNIT=&TEMP,
//              SPACE=(TRK,(50,100))
//*
//SYSUT2     DD UNIT=(&TEMP,SEP=SYSUT1),
//              SPACE=(TRK,(50,100))
//*
//SYSUT3     DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2)),
//              SPACE=(TRK,(50,100))
//*
//SYSUT4     DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2,SYSUT3)),
//              SPACE=(TRK,(50,100))
//*
//LKED    EXEC PGM=IEWL,
//              PARM='LIST,LET,XREF',
//              COND=(5,LT,COBOL),
//              REGION=100K,
//              TIME=(1,0)
//*
//* LINK-EDIT RETRIEVAL
```

(page 2 of 3)

Figure 5.2.2-k - continued. Cataloged Procedure AQRTM20

```
//*
//*                                                              00011700
//* INPUT DATA SET - AUTO-CALL LIBRARY                           00011800
//SYSLIB    DD DSNAME=&PROJECT..LOAD,                            00011900
//             VOLUME=(PRIVATE,RETAIN),                          00012000
//             DISP=(SHR,PASS)                                   00012100
//          DD DSNAME=SYS1.COBLIB,                               00012200
//             DISP=(SHR,PASS)                                   00012300
//*                                                              00012400
//* INPUT DATA SET - COBOL RETRIEVAL PROGRAM OBJECT CODE         00012500
//*                                                              00012600
//SYSLIN    DD DSNAME=&&OBJMOD,                                  00012700
//             DISP=(OLD,DELETE)                                 00012800
//          DD DDNAME=INPUT,                                     00012900
//             DCB=BLKSIZE=80                                    00013000
//*                                                              00013100
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                        00013200
//*                                                              00013300
//SYSPRINT  DD SYSOUT=&OUT                                       00013400
//*                                                              00013500
//* OUTPUT DATA SET - COBOL RETRIEVAL PROGRAM LOAD MODULE        00013600
//*                                                              00013700
//SYSLMOD   DD VOLUME=(PRIVATE,RETAIN),                          00013800
//             DISP=(OLD,PASS),                                  00013900
//             DSNAME=&PROJECT..LOAD(&PGMSAVE)                   00014000
//*                                                              00014100
//* UTILITY DATA SET                                             00014200
//*                                                              00014300
//SYSUT1    DD UNIT=&TEMP,                                       00014400
//             SPACE=(TRK,(10,5))                                00014500
//*                                                              00014600
                                                                 00014700
```

(page 3 of 3)

Figure 5.2.2-k - continued. Cataloged Procedure AQRTM20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FTMSTRAA would be the full data set name of an AQDHS-II master file)
PROGRAM	ARTLNGP	Retrieval language processor program
TEMP	SYSDA	Unit type for temporary work space
PGMSAVE	ARTDFLT	Output load module member name
MEMBER	ARTSKEL	Retrieval program skeleton
OUT	A	SYSOUT class for all print files

Figure 5.2.2-1. Substitutable Parameters for AQRTM20

5.2.3 GENERATED RETRIEVAL PROGRAM - ARTGENR (AQ0120)

5.2.3.1 Description

ARTGENR (AQ0120), the generated retrieval program, is the second of two AQDHS-II programs used to retrieve data from the AQDHS-II master file. The retrieval language processor program, ARTLNGP (AQ0110), generates ARTGENR (AQ0120), and must, therefore, be executed first. All retrieval requests and options are specified on control cards and retrieval specification cards input to ARTLNGP (AQ0110) (see Section 5.2.2.2).

The retrieval process may be performed two ways. The first is to execute the procedure AQRTM10 (see Section 5.7). This procedure executes ARTLNGP (AQ0110), then compiles, link-edits, and executes ARTGENR (AQ0120); ARTGENR (AQ0120) is not saved. The second method allows for the generated retrieval program to be saved for future runs (on other AQDHS-II master files). Two procedures are used in this method; they may be run together in one job stream or at different times. The first of these procedures, AQRTM20, executes ARTLNGP (AQ0110), then compiles, link-edits, and saves the generated retrieval load module (see Section 5.2.2.5). The second procedure, AQRTM30, executes the stored retrieval load module (see Section 5.2.3.5). This load module corresponds to ARTGENR, but a different name should be used so that more than one retrieval can be stored.

Further discussion of the AQDHS-II retrieval specifications, including sample retrievals, can be seen in Section 5.2.2.2.

5.2.3.2 File Formats

ARTGENR (AQ0120) uses one input file, the AQDHS-II master file. See Figure 4.5.3-a for the master file format.

There are three files which are output from ARTGENR (AQ0120): a retrieved answer file, an optional listing of the answer file, and a diagnostic report. The answer file format is the same as that of the AQDHS-II master file; however, the sliding average answer file can only be input to the sliding average program ASTSLAV (AQ0180). See Figure 5.2.3-a for an example of the diagnostic report and Figure 5.2.3-b for an example of the answer file listing.

5.2.3.3 Options

No option card is input to ARTGENR (AQ0120). The optional features of the retrieval (such as the answer file listing and the type of answer file to be produced are specified on the $$SELECT control card input to the retrieval language processor program, ARTLNGP (AQ0110). See Section 5.2.2.2 for a complete description of the $$SELECT card.

5.2.3.4 Error Messages

ARTGENR 001 ABORT - MASTER FILE CONTAINS NO RECORDS

Meaning: The input master file as specified in the user-supplied JCL contains no records; therefore, the run was terminated.

Action: Correct the file name and resubmit the job.

ARTGENR 002 CONDITIONAL - ANSWER FILE CONTAINS NO RECORDS

Meaning: No records were found fitting the criteria specified in the retrieval statements.

Action: Check the retrieval statements for accuracy if some records should have been retrieved. Correct any errors and resubmit the job.

5.2.3.5 Cataloged JCL

The cataloged procedure AQRTM30 executes a stored generated retrieval load module and produces an answer file. This load module must have first been created and stored using the cataloged procedure AQRTM20. Information on AQRTM20 can be found in Section 5.2.2.5.

5.2.3.5.1 JCL listing - Figure 5.2.3-c contains a listing of the cataloged procedure AQRTM30, which executes the program ARTGENR (AQ0120).

5.2.3.5.2 Cross-reference of DD names and files

Program Name: ARTGENR (AQ0120)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSANSWR	Retrieved answer file	Output
AQSPMSTR	Answer file listing	Output
AQSPRINT	Diagnostic report	Output

5.2.3.5.3 - User-supplied JCL - To execute the cataloged procedure AQRTM30, the user must supply job accounting information, data set names of the AQDHS-II master file and the answer file, and the data set name of the stored retrieval load module. See Figure 5.2.3-d for a description of the procedure's substitutable parameters.

5.2.3.5.4 - Sample run stream - The following run stream uses the procedure AQRTM30 to execute the retrieval load module ARTGEN1. ARTGEN1 was created and stored by the procedure AQRTM20 (see Section 5.2.2.5.4 for the run stream). This retrieval will select all records for state 12 and site 001. The master file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQFINAL' and the answer file is

'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSR36'. See Figure 5.2.3-a for sample output.

```
//   EXEC   AQRTM30,
//          PROGRAM=ARTGEN1,
//          MSTRFIL=AQFINAL,
//          ANSWRFL=RTANSR36
```

5.2.3.6 Warnings and Special Instructions

When ARTLNGP (AQ0110) is run and encounters an ABORT error ARTGENR (AQ0120) will execute if following it, but will not produce a valid answer file. Generally, the error message 'ARTGENR 001 ABORT - MASTER FILE CONTAINS NO RECORDS' will be printed. When this occurs, correct the error from ARTLNGP (AQ0110) and resubmit the job.

The language processor program ARTLNGP (AQ0110) must always be run prior to running the generated retrieval program ARTGENR (AQ0120). The two programs may be run together using the procedure AQRTM10 or the generated retrieval module may be stored and run at a later date, using procedures AQRTM20 and AQRTM30.

The answer file is only a subset of the master file; any changes made to the answer file during the retrieval process are not reflected in the master file.

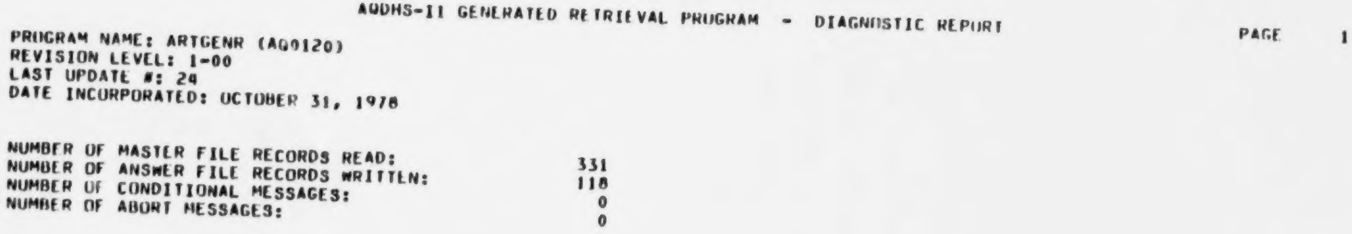
5.2.3.7 Cost Considerations

The following estimates are for the execution, on an IBM 370/168, of the sample run stream shown in Section 5.2.3.5.4 and illustrate the cost of executing AQRTM30.

Size of AQDHS-II master file:	291 records
Size of answer file:	1 record
CPU time:	.1 second
I/O time:	3.7 seconds
Total time:	3.8 seconds
Estimated cost:	$1.07

5.2.3.8 Related Programs and Procedures

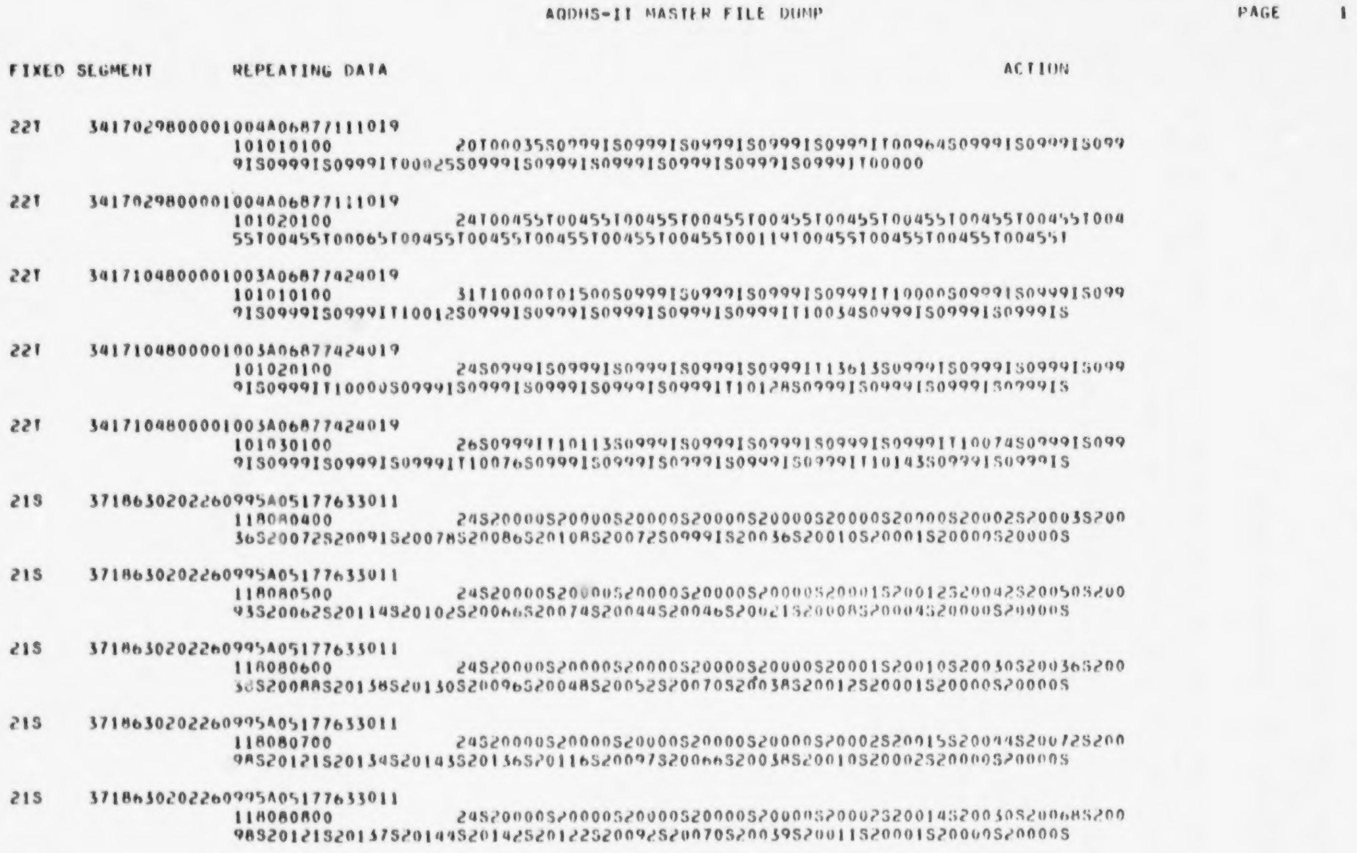
The cataloged procedure AQRTM10 should be used to perform one-time retrievals. It executes the retrieval language processor program, ARTLNGP (AQ0110), then compiles, link-edits, and executes the generated retrieval program, ARTGENR (AQ0120). After the retrieval has been completed, the generated retrieval program is deleted. For additional information on AQRTM10, see Section 5.7.



```
                        AQDHS-II GENERATED RETRIEVAL PROGRAM  -  DIAGNOSTIC REPORT                    PAGE    1
PROGRAM NAME: ARTGENR (AQ0120)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

NUMBER OF MASTER FILE RECORDS READ:                      331
NUMBER OF ANSWER FILE RECORDS WRITTEN:                   118
NUMBER OF CONDITIONAL MESSAGES:                            0
NUMBER OF ABORT MESSAGES:                                  0
```

Figure 5.2.3-a. Diagnostic Report



```
                                   AQDHS-II MASTER FILE DUMP                                         PAGE     1

FIXED SEGMENT       REPEATING DATA                                                      ACTION

22T    3417029800001004A06877111019
                   101010100           20T00035S0999IS0999IS0999IS0999IS0999IT00964S0999IS0999IS099
                   9IS0999IS0999IT00025S0999IS0999IS0999IS0999IS0999IS0999IT00000

22T    3417029800001004A06877111019
                   101020100           24T00455T00455T00455T00455T00455T00455T00455T00455T00455T004
                   55T00455T00065T00455T00455T00455T00455T00455T00119T00455T00455T00455T00455T

22T    3417104800001003A06877424019
                   101010100           31T10000T01500S0999IS0999IS0999IS0999IT10000S0999IS0999IS099
                   9IS0999IS0999IT10012S0999IS0999IS0999IS0999IS0999IT10034S0999IS0999IS0999IS

22T    3417104800001003A06877424019
                   101020100           24S0999IS0999IS0999IS0999IS0999IT13613S0999IS0999IS0999IS099
                   9IS0999IT10000S0999IS0999IS0999IS0999IS0999IT10128S0999IS0999IS0999IS0999IS

22T    3417104800001003A06877424019
                   101030100           26S0999IT10113S0999IS0999IS0999IS0999IS0999IT10074S0999IS099
                   9IS0999IS0999IS0999IT10076S0999IS0999IS0999IS0999IS0999IT10143S0999IS0999IS

21S    37186302022260995A05177633011
                   118080400           24S20000S20000S20000S20000S20000S20000S20000S20002S20003S200
                   36S20072S20091S20078S20086S20108S20072S0999IS20036S20010S20001S20000S20000S

21S    37186302022260995A05177633011
                   118080500           24S20000S20000S20000S20000S20000S20001S20012S20042S20050S200
                   93S20062S20114S20102S20066S20074S20044S20046S20021S20008S20004S20000S20000S

21S    37186302022260995A05177633011
                   118080600           24S20000S20000S20000S20000S20000S20001S20010S20030S20036S200
                   38S20088S20138S20130S20096S20048S20052S20070S20038S20012S20001S20000S20000S

21S    37186302022260995A05177633011
                   118080700           24S20000S20000S20000S20000S20000S20002S20015S20044S20072S200
                   98S20121S20134S20143S20136S20116S20097S20066S20038S20010S20002S20000S20000S

21S    37186302022260995A05177633011
                   118080800           24S20000S20000S20000S20000S20000S20002S20014S20030S20068S200
                   98S20121S20137S20144S20142S20122S20092S20070S20039S20011S20001S20000S20000S
```

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Figure 5.2.3-b. Answer File LIsiting

```
//*
//*    PROCEDURE NAME: AQRTM30
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO RETRIEVE DATA FROM THE AQDHS-II
//*    MASTER FILE BY EXECUTING A GENERATED AQDHS-II RETRIEVAL PROGRAM
//*    THAT HAS BEEN PREVIOUSLY COMPILED AND LINK-EDITED
//*
//*
//AQRTM30 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=RXRETRGO,
//             TIME1='1,0',
//             MSTRFIL=AQMASTER,
//             ANSWRFL=AQANSWER,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             OUT=A
//*
//*
//RETRIEVE EXEC PGM=&PROGRAM,
//             REGION=100K,
//             TIME=(&TIME1)
//*
//* RETRIEVE ANSWER FILE FROM MASTER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - ANSWER FILE
//*
//AQSANSWR  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&ANSWRFL
//*
//* OUTPUT DATA SET - ANSWER FILE CONFIRMATION LISTING
//*
//AQSPMSTR  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
```

(page 1 of 2)

Figure 5.2.3-c. Cataloged Procedure AQRTM30

```
//AQSPRINT  DD SYSOUT=&OUT                                              00005900
//*                                                                     00006000
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006100
//*                                                                     00006200
//SYSPRINT  DD SYSOUT=&OUT                                              00006300
//*                                                                     00006400
//SYSOUT    DD SYSOUT=&OUT                                              00006500
//*                                                                     00006600
//SYSDBOUT  DD SYSOUT=&OUT                                              00006700
//*                                                                     00006800
//SYSDTERM  DD SYSOUT=&OUT                                              00006900
//*                                                                     00007000
//SYSUDUMP  DD SYSOUT=&OUT                                              00007100
//*                                                                     00007200
```

(page 1 of 2)

Figure 5.2.3-c - continued. Cataloged Procedure AQRTM30

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQMASTER would be the full data set name of an AQDHS-II master file)
PROGRAM	ARTDFLT	Stored retrieval load module (created by AQRTM20)
TIME1	'1,0'	Time allocated for execution of retrieval
MSTRFIL	AQMASTER	Lowest-level index of master file
ANSWRFL	AQANSWER	Lowest-level index of answer file
UNIT	3330	Unit type upon which the answer file is to reside
SERIAL	CDHSPK	Volume serial number of volume to which answer file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of answer file
SPCUNIT	TRK	Units in which space for answer file is to be allocated
PRIMARY	20	Primary space allocation for answer file
SECNDRY	10	Secondary space allocation for answer file
OUT	A	SYSOUT class for all print files

Figure 5.2.3-d. Substitutable Parameters for AQRTM30

5.3 STATISTICAL ANALYSIS

5.3.1 INTRODUCTION

There are two AQDHS-II statistical reports: the statistical analysis report and the sliding average report. This section discusses how these reports are produced.

5.3.1.1 Statistical Analysis Report

The AQDHS-II statistical analysis report is patterned after the SAROAD statistical analysis report. The AQDHS-II statistical analysis report may be produced using air quality data from the AQDHS-II master file or any AQDHS-II answer file.

The user is afforded many options in the production of the statistical analysis report: the maximum number of lines to be printed per page can be specified; the user can specify a page break to be generated either when the state code changes or when any change in the site key occurs; the user can specify a statistical analysis by month, quarter, year, or total time period (earliest to latest dates contained in the input file). Since the statistical analysis package can be processed using any answer file, the user can retrieve specific data from the master file (refer to Section 5.2) prior to execution of the statistical analysis package. This allows the user to perform a statistical analysis of selected data from the master file.

The statistical analysis package processes all records in the input master or answer file. The data is grouped according to site key (state, AQCR, county, area, site, agency, and project codes) and parameter key (parameter, method, and units codes). The data is further grouped by year, quarter, or month if a yearly, quarterly, or monthly report is being generated.

For each group of data, the following statistics are produced: percent of the possible observations (readings) recorded for the time period; number of observations; minimum detectable value; minimum observation; 10th, 30th, 50th, 70th, 90th, 95th, and 99th percentiles; maximum observation; second maximum observation; third maximum observation; arithmetic mean; arithmetic standard deviation; geometric mean; and geometric standard deviation. The means and the standard deviations may be truncated before being printed; thus, the right-most digit of these statistics may be one too low. Also, the percentiles will be computed using a normalized frequency distribution when the difference between the minimum and maximum observations is very large; thus, in these cases there may be a slight error in the percentiles.

Four programs make up the statistical analysis package: the master file sort program, ASRMSTR (AQ0140); the preliminary statistics program, ASTPRLM (AQ0190); the statistical analysis program, ASTMSST (AQ0200); and the statistical report program, ARPMSST (AQ0270). A system flowchart of the statistical analysis package is shown in Figure 5.3.1-a.

The master file sort program, ASRMSTR (AQ0140), is executed using the STAT option to sort the input master or answer file into site key/parameter key/date order. Execution of ASRMSTR (AQ0140) is necessary if the input master or answer file contains data from more than one calendar year and a total time period report is being produced or if the input answer file was produced by a batched retrieval. Execution of ASRMSTR (AQ0140) is strongly recommended if the input master or answer file contains data from more than one calendar year and a monthly, quarterly, or yearly report is being produced; if the file is so sorted, all statistics for a given site/parameter key combination will appear together in the report. Execution of ASRMSTR

(AQ0140) is not necessary if the input master or answer file does not contain data from more than one calendar year. (Refer to Section 6.4.2.5.4 for examples of runs in which the master or answer file must be sorted and in which the master or answer file need not be sorted.)

The preliminary statistics program, ASTPRLM (AQ0190), reads the sorted master or answer file and the parameter file, performs preliminary analyses, and produces two temporary files that are passed to ASTMSST (AQ0200). The option card read by ASTPRLM (AQ0190) specifies whether a monthly, quarterly, yearly, or total time period report is to be produced.

The statistical analysis program, ASTMSST (AQ0200), reads the temporary files produced by ASTPRLM (AQ0190), performs further statistical analyses; and produces a temporary file which is used by ARPMSST (AQ0270) to produce the report.

The statistical report program, ARPMSST (AQ0270), reads the temporary file passed from ASTMSST (AQ0200) and prints the statistical analysis report. The option card read by ARPMSST (AQ0270) specifies the maximum number of lines to be printed on each page and whether a page break is to be generated when the state code changes or when any change in the site key occurs.

Refer to the following sections for a detailed discussion of each of the programs used in the statistical analysis procedure: ASRMSTR (AQ0140), Section 5.6; ASTPRLM (AQ0190), Section 5.3.2; ASTMSST (AQ0200), Section 5.3.3; ARPMSST (AQ0270), Section 6.4.1.

ASRMSTR (AQ0140) is executed by the cataloged procedure AQSRM10, which is discussed in Section 5.6.2.5. ASTPRLM (AQ0190), ASTMSST (AQ0200), and ARPMSST (AQ0270) are executed by the cataloged procedure AQRPM10, which is discussed in Section 6.4.2.5. Examples of job streams to produce statistical analysis reports are presented in Section 6.4.2.5.4.

5.3.1.2 Sliding Average Report

The AQDHS-II sliding average programs provide the user with a sliding (i.e., running or moving) average of readings from the AQDHS-II master file. This sliding average is of interest to the user because air quality standards for some pollutants are expressed in terms of averages that cannot be exceeded more than once per year. For example, the carbon monoxide level exceeds federal standards if an eight-hour average of 10 mg/m^3 is exceeded more than once per year.

Unlike the statistical analysis report, the current AQDHS-II sliding average report does not duplicate the sliding average reports in SAROAD. The SAROAD sliding average reports are produced for certain combinations of pollutants and sampling intervals. The AQDHS-II sliding average report can be produced for any parameter and sampling interval combination existing in the AQDHS-II master file. The user can, however, execute the AQDHS-II sliding average programs using certain options that will produce the same information as is produced by the SAROAD sliding average reports.

Six steps must be executed to produce a sliding average report: the retrieval language processor program, ARTLNGP (AQ0110); the COBOL compiler; the linkage editor; the generated retrieval program, ARTGENR (AQ0120); the sliding average program, ASTSLAV (AQ0180); and the master file detailed report program, ARPMSTR (AQ0230). Figure 5.3.1.-b presents a flowchart of the sliding average programs. These programs are briefly discussed below.

ARTLNGP (AQ0110) is executed using the SLIDING option. The retrieval specifications input to ARTLNGP (AQ0110) should specify which data from the master file is to be included in the sliding average report. The user can minimize the size and expense of the sliding average report by coding retrieval specification statements to select only the data in which he is specifically interested.

ARTLNGP (AQ0110) produces a diagnostic report and a source module for ARTGENR (AQ0120). This source module will be tailored to the retrieval specifications read by ARTLNGP (AQ0110) and must be compiled and link edited to produce a load module for ARTGENR (AQ0120) which is then executed.

When ARTGENR (AQ0120) is executed, it will process the master file, select those records satisfying the retrieval specifications, and produce a sliding average answer file and a diagnostic report. It will also produce a listing of the answer file if the retrieval specifications input to ARTLNGP (AQ0110) include the LIST option.

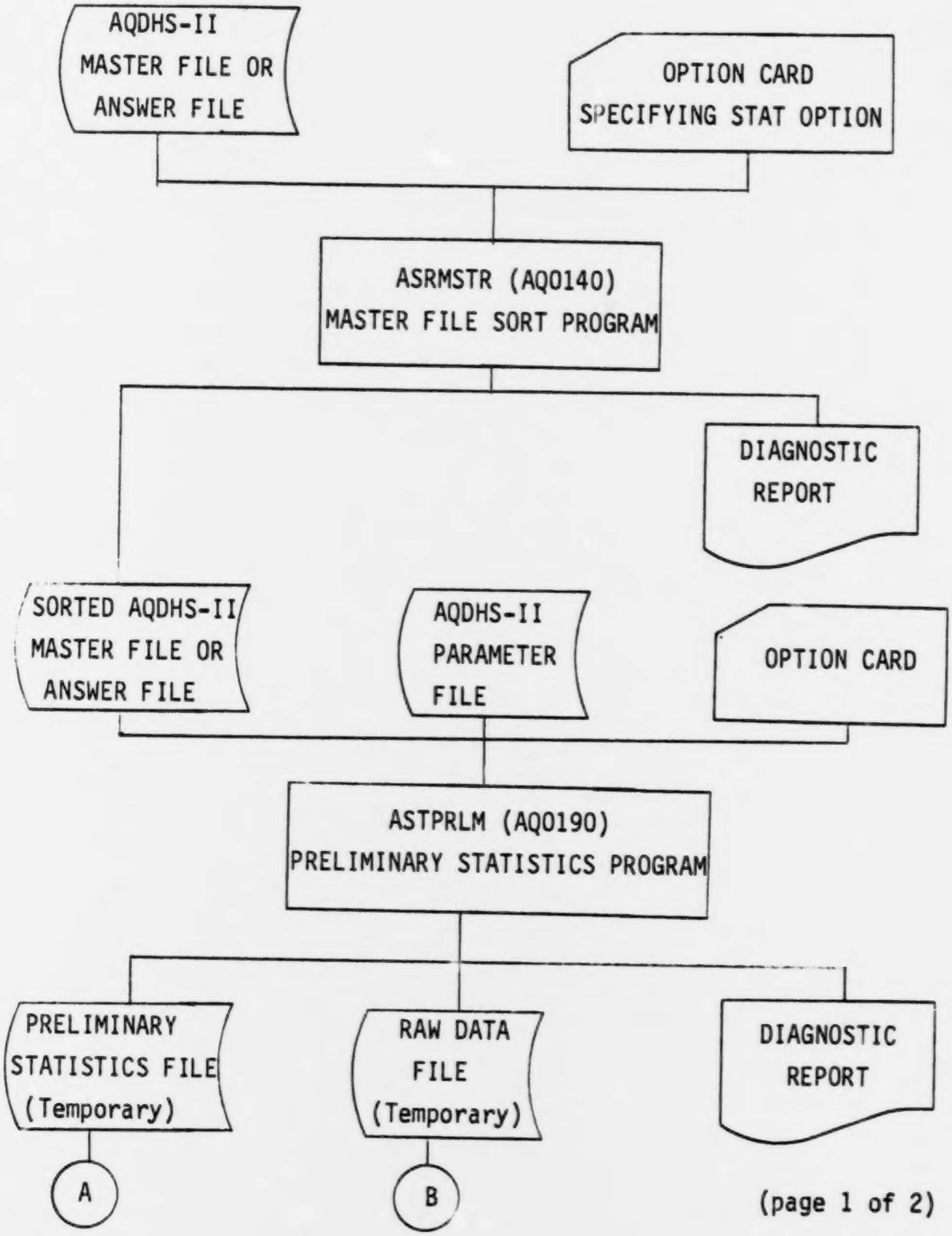
The sliding average answer file and an option card are input to ASTSLAV (AQ0180). The option card specifies the interval size of the sliding average. For example, if an interval of three is specified and hourly data is being processed, each reading is averaged with the readings for the two previous hours. The option card also specifies whether more than 50% or at least 75% of the readings in each interval must be present before an average for the interval is computed. ASTSLAV (AQ0180) calculates the averages and produces a sliding average values file and a diagnostic report.

The sliding average values file is input to ARPMSTR (AQ0230), which also reads the parameter file, the site file, the parameter standards file, and an option card.

The option card may specify a DISPLAY option (i.e., print only those averages that are less than, equal to, or greater than a specified value) or it may be omitted. If the option card is omitted, all averages are printed.

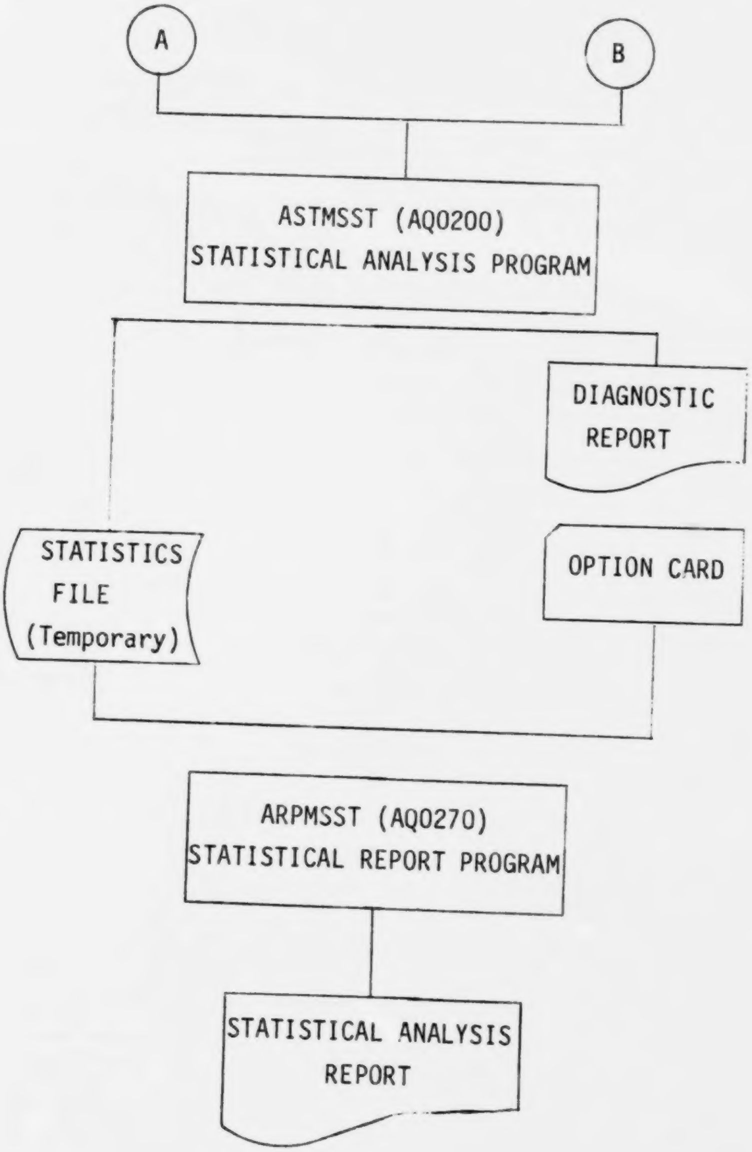
ARPMSTR (AQ0230) produces a diagnostic report and the sliding average report. Examples of the sliding average report are shown in Figure 6.2.2-b. The information in the headings is obtained from the parameter, parameter standards, and site files.

Refer to the following sections for a detailed discussion of each of the sliding average programs: ARTLNGP (AQ0110), Section 5.5.2; ARTGENR (AQ0120), Section 5.5.3; ASTSLAV (AQ0180), Section 5.3.4; ARPMSTR (AQ0140), Section 5.6.2. An example which illustrates the computation of sliding averages is presented in Section 5.3.4.1.


AQDHS-II MASTER FILE OR ANSWER FILE
OPTION CARD SPECIFYING STAT OPTION
ASRMSTR (AQ0140) MASTER FILE SORT PROGRAM
DIAGNOSTIC REPORT
SORTED AQDHS-II MASTER FILE OR ANSWER FILE
AQDHS-II PARAMETER FILE
OPTION CARD
ASTPRLM (AQ0190) PRELIMINARY STATISTICS PROGRAM
PRELIMINARY STATISTICS FILE (Temporary)
RAW DATA FILE (Temporary)
DIAGNOSTIC REPORT
A
B

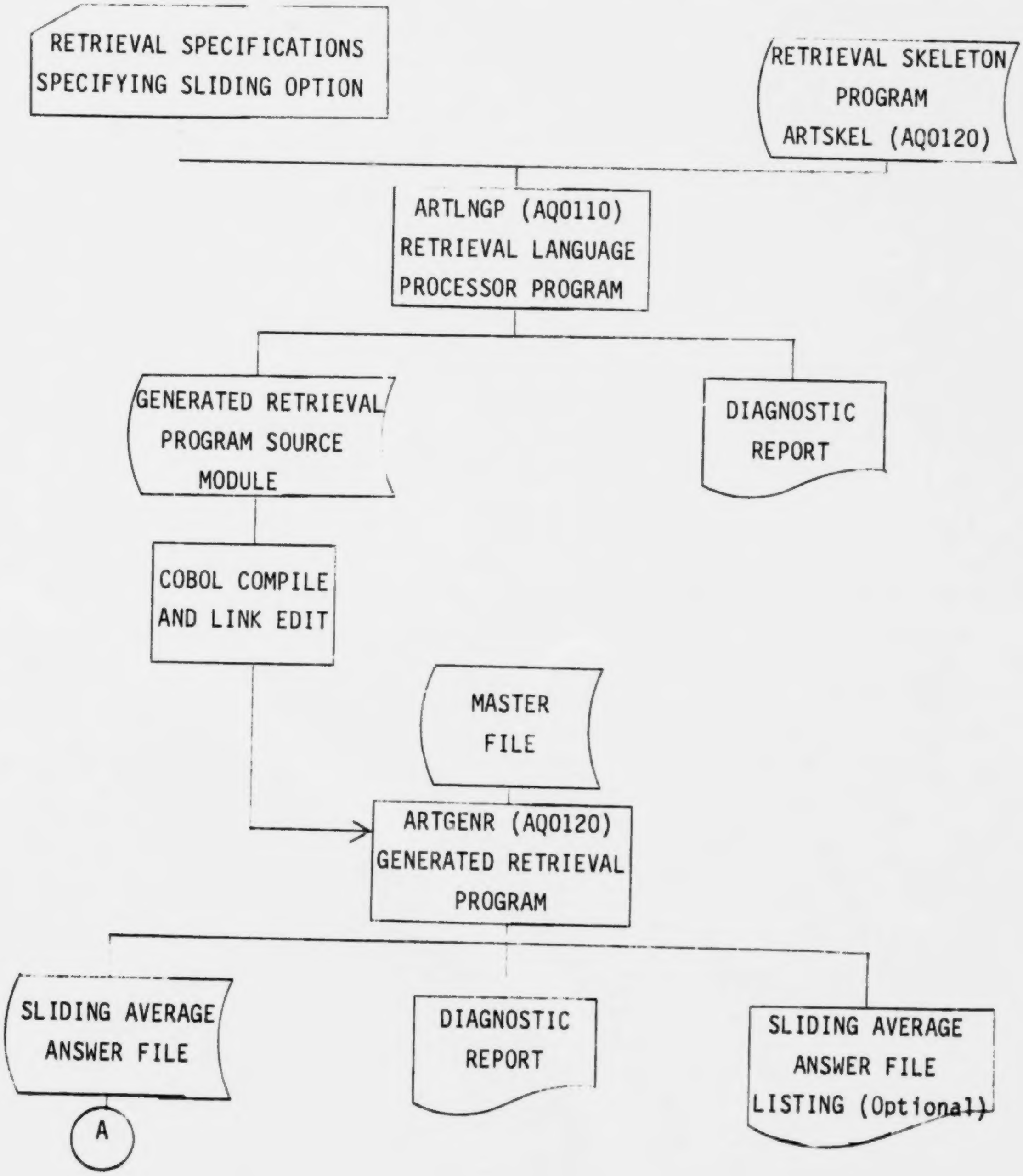
(page 1 of 2)

Figure 5.3.1-a. Statistical Analysis System Flowchart


A
B
ASTMSST (AQ0200)
STATISTICAL ANALYSIS PROGRAM
DIAGNOSTIC REPORT
STATISTICS FILE (Temporary)
OPTION CARD
ARPMSST (AQ0270)
STATISTICAL REPORT PROGRAM
STATISTICAL ANALYSIS REPORT

(page 2 of 2)

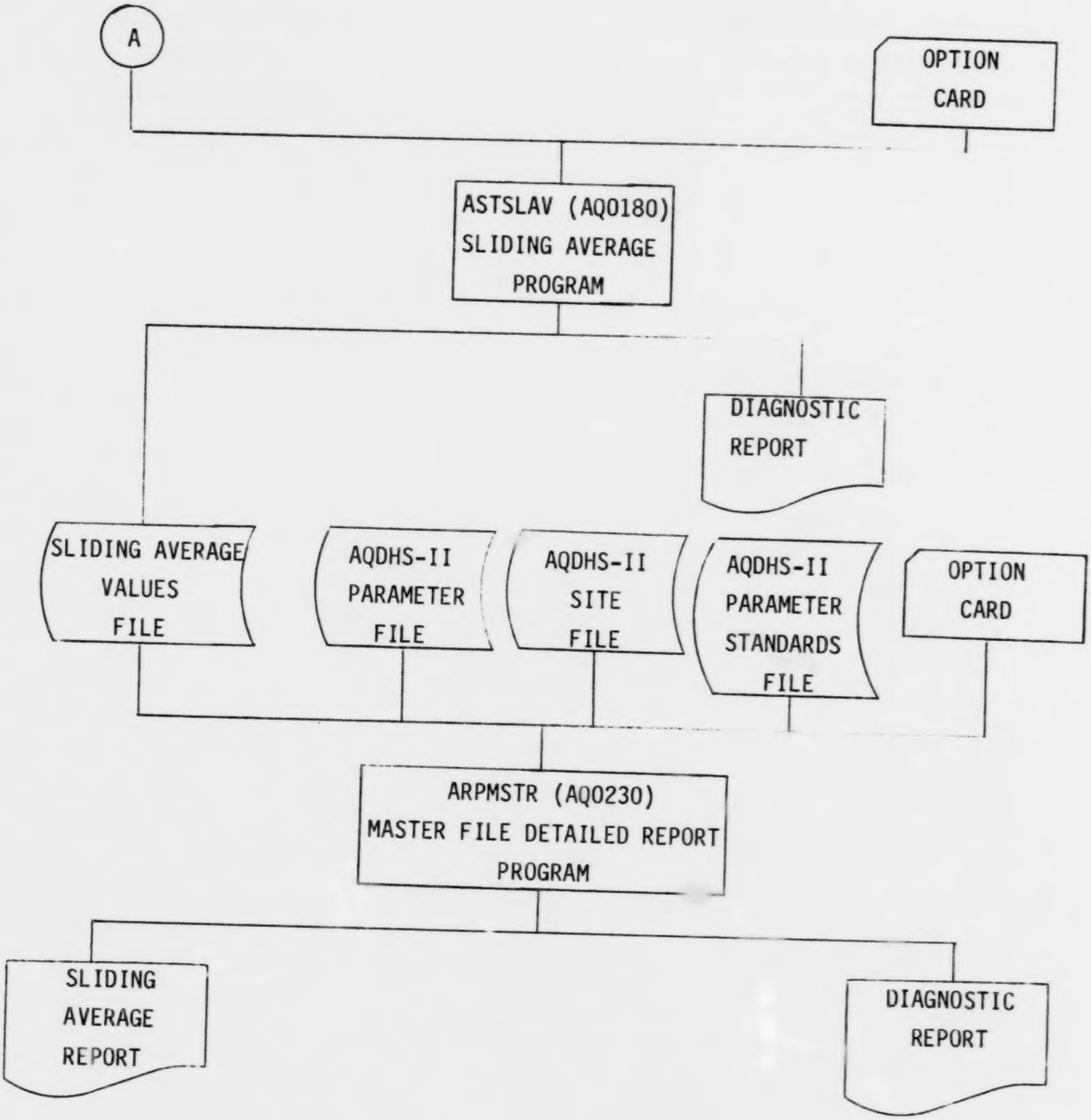
Figure 5.3.1-a - Continued. Statistical Analysis System Flowchart



RETRIEVAL SPECIFICATIONS SPECIFYING SLIDING OPTION
RETRIEVAL SKELETON PROGRAM ARTSKEL (AQ0120)
ARTLNGP (AQ0110) RETRIEVAL LANGUAGE PROCESSOR PROGRAM
GENERATED RETRIEVAL PROGRAM SOURCE MODULE
DIAGNOSTIC REPORT
COBOL COMPILE AND LINK EDIT
MASTER FILE
ARTGENR (AQ0120) GENERATED RETRIEVAL PROGRAM
SLIDING AVERAGE ANSWER FILE
A
DIAGNOSTIC REPORT
SLIDING AVERAGE ANSWER FILE LISTING (Optional)

(Page 1 of 2)

Figure 5.3.1-b. Sliding Average Flowchart


A
OPTION CARD
ASTSLAV (AQ0180) SLIDING AVERAGE PROGRAM
DIAGNOSTIC REPORT
SLIDING AVERAGE VALUES FILE
AQDHS-II PARAMETER FILE
AQDHS-II SITE FILE
AQDHS-II PARAMETER STANDARDS FILE
OPTION CARD
ARPMSTR (AQ0230) MASTER FILE DETAILED REPORT PROGRAM
SLIDING AVERAGE REPORT
DIAGNOSTIC REPORT

(Page 2 of 2)

Figure 5.3.1-b - Continued. Sliding Average Flowchart

5.3.2 PRELIMINARY STATISTICS PROGRAM: ASTPRLM (AQ0190)

5.3.2.1 Description

ASTPRLM (AQ0190) is executed prior to the statistical analysis program, ASTMSST (AQ0200), and the statistical report program, ARPMSST (AQ0270). In most instances, ASTPRLM (AQ0190) will be executed after ASRMSTR (AQ0140). ASTPRLM (AQ0190) reads the AQDHS-II master file, or any AQDHS-II answer file, and an option card and converts the master/answer file to a FORTRAN-compatible file. Preliminary statistical analyses are performed and two temporary FORTRAN-compatible output files are passed to ASTMSST (AQ0200). A diagnostic report which contains audit trail information is also provided for the users.

The statistics computed by ASTPRLM (AQ0190) are the maximum reading, second maximum reading, third maximum reading, and minimum reading. Since ASTPRLM (AQ0190) must process each reading in the input master/answer file and convert it to a FORTRAN-compatible format, these statistics are computed by ASTPRLM (AQ0190) to reduce the number of times a reading is processed and thus reduce costs. The minimum detectable value, beginning and ending dates for each set of data processed, and the average of the decimal point indicators for all readings are included in each set. These statistics are passed to ASTMSST (AQ0200) in the preliminary statistics file, which is one of the temporary files passed to ASTMSST (AQ0200).

The readings from the input master or answer file are passed to ASTMSST (AQ0200) in the raw data file, which is the other temporary file passed to ASTMSST (AQ0200). ASTMSST (AQ0200) performs further statistical analyses on these readings.

5.3.2.2 File Formats

Inputs to this program are an AQDHS-II master file or answer file, the associated parameter file, and an option card. See Figure 4.5.3-a for the master file format, Figure 4.2.2-c for the parameter file format, and Section 5.3.2.3 for a discussion of the option card.

Sorting of the input master or answer file prior to its use by ASTPRLM (AQ0190) is (1) required if either the input master or answer file contains data from more than one calendar year and the TOTAL option (refer to 5.3.1.3) is specified or the input answer file was produced by a batch retrieval, (2) strongly recommended if the input master or answer file contains data from more than one calendar year and the MONTH, QUARTER, or YEAR option (refer to 5.3.2.3) is specified, and (3) unnecessary if the input master or answer file contains data from only one calendar year and is in the standard sequence. The sorting can be accomplished by executing the master file sort program, ASRMSTR (AQ0140), using the STAT option (see Section 5.6.2, Master File Sort Program). The required order of the input master or answer file is shown in Figure 5.6.2-e.

Output consists of a diagnostic report and two temporary files: a raw data file and a preliminary statistics file. The diagnostic report contains update messages, diagnostic messages, and summary statistics. An example of the diagnostic report is shown in Figure 5.3.2-a. The raw data file and the preliminary statistics file are FORTRAN-compatible files that are passed to ASTMSST (AQ0200). The raw data file contains the readings from the input master or answer file. The preliminary statistics file contains the following statistics for each set of data processed: maximum reading, second maximum reading, third maximum reading, minimum reading, minimum detectable value, beginning and ending dates of the readings, and the average of the decimal point indicators for all readings.

5.3.2.3 Options

The option card input to ASTPRLM (AQ0190) affects the execution of ASTPRLM (AQ0190), ASTMSST (AQ0200), and ARPMSST (AQ0270) by specifying whether the statistical analysis is done by month, by quarter, by year, or for the total time period.

The data in the input master or answer file is grouped by site key and parameter key. Under the TOTAL option, no further grouping of the data is done and the statistical analysis for each site/parameter key combination is performed based on all readings reported for that site/parameter key combination.

If the MONTH, QUARTER, or YEAR option is specified, the data is further grouped by month, quarter, or year, respectively, and a statistical analysis is performed for each month, quarter, or year for each site/parameter key combination. If the MONTH option is specified, all records containing quarterly readings are bypassed.

The TOTAL option is specified by entering TOTAL on the option card. It is the default option if either a blank option card or no option card is used. The MONTH, QUARTER, and YEAR options are specified by entering the option desired on the option card. If an invalid option is used, the execution of ASTPRLM (AQ0190) will be aborted and no statistical analysis done. See Figure 5.3.2-b for the format of the option card.

5.3.2.4 Error Messages

ASTPRLM 001 ABORT - NO INPUT RECORDS

Meaning: The input master or answer file contains no records; therefore, the run was terminated.

Action: Verify that the correct file was input.

ASTPRLM 002 ABORT - INVALID OPTION CARD

Meaning: The option card is invalid; therefore, the run was terminated.

Action: Correct the option card and resubmit.

ASTPRLM 003 ABORT - NUMBER OF PARM FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: ASTPRLM (AQ0190) has been incorrectly modified: the maximum number of parameters specified in the program is larger than the size of the parameter array; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the size of the array.

ASTPRLM 004 ABORT - PARM ARRAY OVERFLOW

Meaning: The input parameter file contains more records than can be stored in the parameter array; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the array.

ASTPRLM 005 ABORT - NO MATCH FOUND ON PARAMETER FILE FOR PARAMETER KEY xxxxxxxxx

Meaning: A parameter key of xxxxxxxxx was found in the input master or answer file, but no matching parameter key was found in the parameter file; therefore, the run was terminated.

Action: Determine which file is in error. The parameter file can be corrected using ASRPARM (AQ0150) and AEMPARM (AQ0070). The master file can be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). Resubmit after the incorrect file has been corrected.

ASTPRLM 006 ABORT - INVALID TIME CODE ENCOUNTERED
(xxxxxxxxxxxxxxxxxxxxxxxxxxx)

Meaning: An invalid time code was found in the input master or answer file. xxxxxxxxxxxxxxxxxxxxxxxxxxx is the state-AQCR-county-area-site-agency-project-time-year-parameter-method-units codes key. Therefore, the run was terminated.

Action: Correct the master or answer file using AEDMSTR (AQ0070), ASRINTR (AQ0130), and AFMMSTR (AQ0100) and resubmit.

ASTPRLM 007 CONDITIONAL - x,xxx,xxx MASTER FILE RECORDS WITH QUARTERLY DATA
WERE BYPASSED

Meaning: This message is printed only when the MONTH option is in effect. It informs the user of the number of master file records that contained quarterly data and were therefore bypassed.

Action: None

5.3.2.5 Cataloged JCL

ASTPRLM (AQ0190) should always be executed in conjunction with ASTMSST (AQ0200) and ARPMSST (AQ0270). The cataloged procedure AQRPM10 executes all three programs. This procedure is discussed in Section 6.4.2.5.

5.3.2.6 Warnings and Special Instructions

As released by NADB, execution of ASTPRLM (AQ0190) will be aborted if the input AQDHS-II parameter file contains more than 200 records. If a parameter file with more than 200 records is to be used, ASTPRLM (AQ0190) must be modified in accordance with the instructions detailed in Appendix C.

Sorting of the input master or answer file prior to use by ASTPRLM (AQ0190) is (1) required if the input master or answer file contains data from more than one calendar year and the TOTAL option (refer to 5.3.2.3) is specified or if the input answer file was produced by a batch run, (2) strongly recommended if the input master or answer file contains data from more than one calendar year and the MONTH, QUARTER, or YEAR option (refer to 5.3.2.3) is specified, and (3) unnecessary if the input master or answer file contains data from only one calendar year and is in the standard sequence. The sorting can be accomplished by executing the master file sort program, ASRMSTR (AQ0140), using the STAT option (see Section 5.6.2, Master File Sort Program). The required order of the input master or answer file is shown in Figure 5.6.2-e.

5.3.2.7 Cost Considerations

The following estimates are for the execution of ASTPRLM (AQ0190) on an IBM 370/168:

Size of AQDHS-II master file:	198 records
Size of output preliminary statistics file:	122 records
Size of output raw data file:	308 records
CPU time:	1.4 seconds
I/O time:	6.8 seconds
Total time:	8.2 seconds
Estimated cost:	$2.16

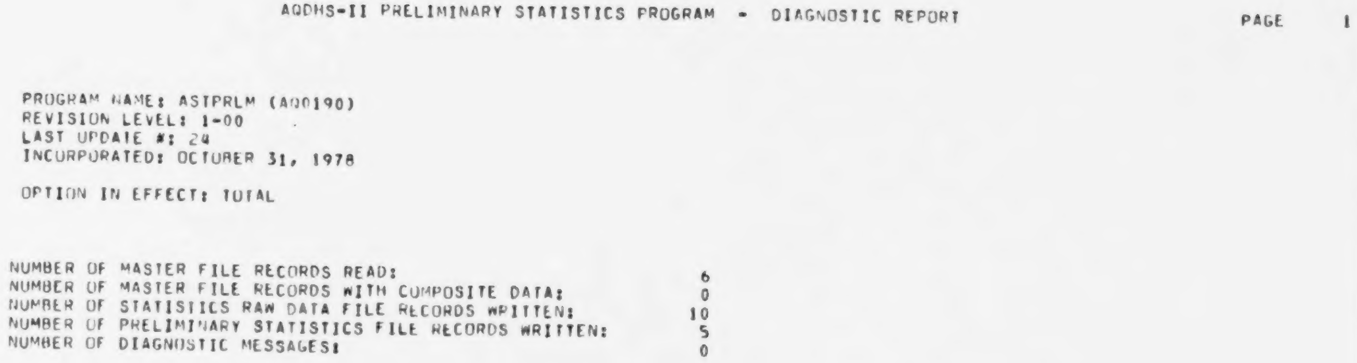
5.3.2.8 Related Programs and Procedures

ASTPRLM (AQ0190) should always be executed in conjunction with ASTMSST (AQ0200) and ARPMSST (AQ0270). The cataloged procedure AQRPM10 executes all three programs (see Section 6.4.2.5).

5.3.2.8 Related Programs and Procedures

ASTPRLM (AQ0190) should always be executed in conjunction with ASTMSST (AQ0200) and ARPMSST (AQ0270). The cataloged procedure AQRPM10 executes all three programs (see Section 6.4.2.5).

The cataloged procedure AQSRM10 can be used to execute ASRMSTR (AQ0140) whenever ASTPRLM (AQ0190) requires a sorted input master or answer file (see Section 5.6.2).



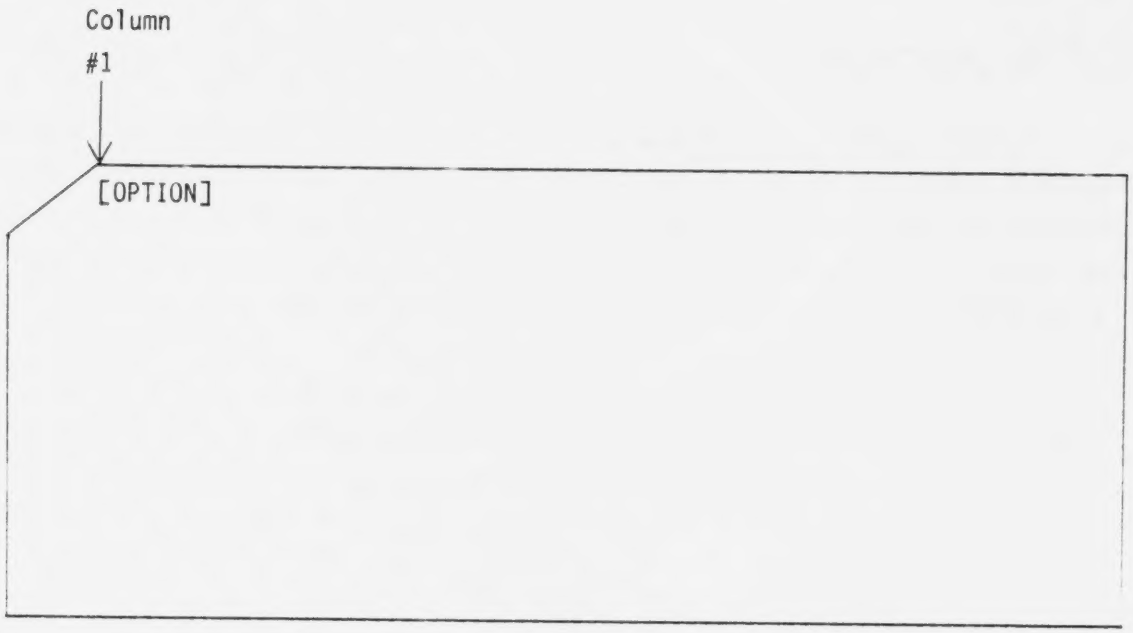
```
                        AQDHS-II PRELIMINARY STATISTICS PROGRAM  -  DIAGNOSTIC REPORT                    PAGE    1

  PROGRAM NAME: ASTPRLM (AQ0190)
  REVISION LEVEL: 1-00
  LAST UPDATE #: 24
  INCORPORATED: OCTOBER 31, 1978

  OPTION IN EFFECT: TOTAL


 NUMBER OF MASTER FILE RECORDS READ:                                6
 NUMBER OF MASTER FILE RECORDS WITH COMPOSITE DATA:                 0
 NUMBER OF STATISTICS RAW DATA FILE RECORDS WRITTEN:               10
 NUMBER OF PRELIMINARY STATISTICS FILE RECORDS WRITTEN:             5
 NUMBER OF DIAGNOSTIC MESSAGES:                                     0
```

Figure 5.3.2-a. Diagnostic Report



1. The specified option must begin in column 1.
2. There can be no spaces between the letters of the option word.
3. The only valid option words are TOTAL, MONTH, QUARTER, and YEAR.

Figure 5.3.2-b. Option Card Format

5.3.3 STATISTICAL ANALYSIS PROGRAM - ASTMSST (AQ0200)

5.3.3.1 Description

ASTMSST (AQ0200) is executed after the preliminary statistics program, ASTPRLM (AQ0190), and before the statistical report program, ARPMSST (AQ0270). ASTMSST (AQ0200) reads two temporary files produced by ASTPRLM (AQ0190), performs statistical analyses, and produces a temporary file which is passed to ARPMSST (AQ0270). ASTMSST (AQ0200) is coded in ANS FORTRAN.

ASTMSST (AQ0200) operates under the option specified on the option card read by ASTPRLM (AQ0190). That option determines whether the statistical analysis report printed by ARPMSST (AQ0270) will be a monthly, quarterly, yearly or total time period report. Refer to Section 5.3.3.3 for a discussion of these options.

The two input files are a preliminary statistics file which contains the results of the statistical analyses performed by ASTPRLM (AQ0190) and a raw data file which contains the non-null readings from the master or answer file read by ASTPRLM (AQ0190). The data on the raw data file has been grouped by site and parameter key and, if appropriate for the option in effect, by month, quarter, or year. For each group of data, the following statistics are computed: percent of possible observations (readings) recorded for the time period; number of observations; 10th, 30th, 50th, 70th, 90th, 95th, and 99th percentiles; arithmetic mean; arithmetic standard deviation, geometric mean; and geometric standard deviation. The following formulas are used to compute the means and standard deviations (X_i is an observation, n is the number of observations):

Arithmetic mean:

$$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n} = \frac{X_1 + X_2 + \ldots + X_n}{n}$$

Arithmetic standard deviation:

$$\sigma = \left[\frac{\sum_{i=1}^{n} X_i^2 - \frac{\left(\sum_{i=1}^{n} X_i \right)^2}{n}}{n - 1} \right]^{1/2}$$

$$= \sqrt{\frac{(X_1^2 + X_2^2 + \ldots + X_n^2) - \frac{(X_1 + X_2 + \ldots + X_n)^2}{n}}{n - 1}}$$

Geometric mean:

$$\bar{X}_g = e^{\left(\frac{\sum_{i=1}^{n} \ln X_i}{n}\right)} = e^{\left(\frac{\ln X_1 + \ln X_2 + \ldots + \ln X_n}{n}\right)}$$

Geometric standard deviation:

$$\sigma_g = e^{\left[\frac{\sum_{i=1}^{n} (\ln X_i)^2 - \frac{\left(\sum_{i=1}^{n} \ln X_i\right)^2}{n}}{n-1}\right]^{1/2}}$$

In the computation of the geometric mean and geometric standard deviation, half of the minimum detectable observation is substituted for all observations that are less than the minimum detectable value. (The number of times this substitution is done is printed in the statistical analysis report.) This technique is the same technique used in the SAROAD statistical analysis program. Since the natural logarithm function cannot be applied to non-positive values, the geometric mean and geometric standard deviation are only computed if all readings in the group of data being analyzed are positive or if the minimum detectable value is positive.

5.3.2.2 File Formats

Input to this program consists of two temporary files passed from ASTPRLM (AQ0190): the preliminary statistics file and the raw data file. See Section 5.3.2.2 for additional information on these files.

Output consists of a diagnostic report (see Figure 5.3.3-a) and a temporary file passed to ARPMSST (AQ0270). This temporary file is referred to as a statistics file; it contains the statistics computed by ASTPRLM (AQ0190) and ASTMSST (AQ0200).

5.3.3.3 Options

ASTMSST (AQ0200) operates under the option specified on the option card read by ASTPRLM (AQ0190). Refer to Section 5.3.2.3 for a detailed discussion of this option card.

5.3.2.4 Error Messages

ASTMSST 001 DISASTER - NO HEADER RECORD ON INPUT STATISTICS FILE

Meaning: The preliminary statistics file has no header record; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 002 DISASTER - NO HEADER RECORD ON INPUT DATA FILE

Meaning: The raw data file has no header record; therefore the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 003 ABORT - NO DATA ON INPUT STATISTICS FILE

Meaning: The preliminary statistics file contains only a header record and a trailer record, therefore, the run was terminated.

Action: Insure that the correct AQDHS-II master or answer file was input to ASTPRLM (AQ0190); rerun ASTPRLM (AQ0190).

ASTMSST 004 ABORT - NO DATA ON INPUT DATA FILE

Meaning: The raw data file contains only a header record and a trailer record; therefore, the run was terminated.

Action: Insure that the correct AQDHS-II master or answer file was input to ASTPRLM (AQ0190); rerun ASTPRLM (AQ0190).

ASTMSST 005 DISASTER - INPUT STATISTICS AND DATA FILES DO NOT CORRESPOND

Meaning: The key information on the preliminary statistics and raw data files do not match; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 006 DISASTER - INVALID AVERAGE DEC PT IND, KEY INFO IS XXXXXXXXXXXXXXXXXXXXXX-YYYYYYY

Meaning: The preliminary statistics file contains an invalid average decimal point indicator; therefore, the run was terminated. XXXXXXXXXXXXXXXXXXXX is the state, AQCR, county, area, site, agency, project, and time code key and YYYYYYYYY is the parameter, method, and units code key of the erroneous record.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 007 DISASTER - INPUT STATISTICS FILE TERMINATED BEFORE INPUT DATA FILE

Meaning: The preliminary statistics file terminated before the raw data file; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 008 DISASTER - INPUT DATA FILE TERMINATED BEFORE INPUT STATISTICS FILE

Meaning: The raw data file terminated before the preliminary statistics file; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

5.3.3.5 Cataloged JCL

ASTMSST (AQ0200) should always be executed in conjunction with ASTPRLM (AQ0190) and ARPMSST (AQ0270). The cataloged procedure AQRPM10 will executes all three programs. This procedure is discussed in Section 6.4.2.5.

5.3.3.6 Warnings and Special Instructions

There are no warnings and no special instructions.

5.3.3.7 Cost Considerations

The following estimates are for the execution of a test run of ASTMSST (AQ0200) on an IBM 370/168:

Size of input data file:	308 records
Size of input preliminary statistics file:	122 records
Size of output statistics file:	360 records
CPU time:	2.0 seconds
I/O time:	5.3 seconds
Total time:	7.3 seconds
Estimated cost:	$3.09

5.3.3.8 Related Programs and Procedures

ASTMSST (AQ0200) is always executed in conjunction with ASTPRLM (AQ0190) and ARPMSST (AQ0270). The cataloged procedure AQRPM10 executes all three programs.

```
                          AQDHS-II STATISTICAL ANALYSIS PROGRAM  -  DIAGNOSTIC REPORT                              PAGE 1
PROGRAM NAME: ASTMSST (AQ0200)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978


NUMBER OF STATISTICS RAW DATA FILE RECORDS READ:            36
NUMBER OF PRELIMINARY STATISTICS FILE RECORDS READ:          6
NUMBER OF STATISTICS FILE RECORDS WRITTEN:                  12
```

Figure 5.5.3-a. Diagnostic Report

5.3.4 SLIDING AVERAGE PROGRAM - ASTSLAV (AQ0180)

5.3.4.1 Description

The sliding average program, ASTSLAV (AQ0180), is used to calculate values for a sliding average report; it does not, however, duplicate the sliding average reports in SAROAD. The file input to ASTSLAV (AQ0180) must be a sliding average answer file created by a SLIDING mode retrieval (see Section 5.2.2.2). The records on the sliding average answer file have been changed to indicate that they are sliding average records; in addition, there are extra records in the file to provide a wraparound capability (such as at the beginning of a year, month, or day that has been retrieved). An option card is also input to ASTSLAV (AQ0180) to indicate the size of the sliding average interval (see Section 5.3.4.3).

The file output by ASTSLAV (AQ0180) contains sliding average values as calculated by the program. This file must be input to ARPMSTR (AQ0230), the master file detailed report program, to produce the sliding average report.

The formula used for the sliding average computation is:

$$S_i = \frac{1}{m} \sum_{j=i-m+1}^{j=i} R_j$$

where:

S_i = the ith sliding average
m = the interval over which the average is computed
R = the value of the reading
j = index to the position of R in the series of readings.

The nth sliding average in the output file is the average of the nth reading in the input file and the (m-1) preceding readings in the input file. All reading positions in the output file will contain a computed sliding average value, provided a sufficient number of readings were contained in the master file. If a sliding average for a reading cannot be computed due to insufficient data, the corresponding output position is set to (9998) which causes *** to be printed in that position by the master file detailed report program, ARPMSTR (AQ0230). The actual number of readings required to calculate the sliding average is determined by the interval for computation specified by the user on the option card. The interval selected by the user must be less than the maximum number of readings that can be contained in a master file record. Thus the maximum interval size will depend upon the type of data as specified by the time code (see Section 5.3.4.3).

ASTSLAV (AQ0180) computes sliding average values for all data that is entered into the program; therefore, the user should retrieve the particular data for which he needs a sliding average file and should then execute ASTSLAV (AQ0180) on that answer file rather than on the entire master file. For example, if the user wants to see a report of three-hourly averages for hourly data of TSP (total suspended particulates) , he should retrieve that data prior to executing ASTSLAV (AQ0180). Should he retrieve all TSP data and not specify only hourly TSP data to be retrieved, the report will show averages for the user specified interval regardless of time code of the raw data. If the master file is large, a much larger (and more expensive) report than desired could be produced unless the user first makes a judicious retrieval.

The following example illustrates the calculations performed by ASTSLAV (AQ0180), the wraparound technique, and the minimum number of readings required, as well as proper use of the retrieval for sliding average.

Suppose a three-hourly average of SO_2 data (parameter 42401) for 1979 is needed. First, a retrieval is run to select hourly data for parameter 42401 and year 1979. The retrieval specifications (as defined in Section 5.2.2) are as follows:

```
$$SELECT            SLIDING
YEAR           =    '79'              AND
PARAMETER-CODE =    '42401'           AND
TIME-CODE      =    '1'
$$END
```

Five records satisfied the retrieval criteria; these records are for the days January 1, 2, 31 and February 1, 3. In addition to these records, special wraparound records were generated (with null-value readings) for January 30, 1979 and February 2, 1979. Also the record for December 31, 1978 (which does not meet the retrieval criteria) was retrieved and flagged as a wraparound record. The readings for the retrieved records are shown in Figure 5.3.4-a. The generated wraparound records are not shown.

Next, program ASTSLAV (AQ0180) is run; an interval of three is specified on the option card. The first record in the input sliding average answer file is December 31, 1978; this is a wraparound record and is held for use in computing sliding average values for January 1, 1979.

Using the specified interval of 3, the first sliding average value (for hour 0) is computed using hours 22 and 23 from December 31 and hour 0 from January 1. All three values are 0; thus, the resulting sliding average value is 0. The second sliding average value uses hour 23 from December 31 (reading 0), plus the first two readings from January 1, (readings 0 and .1). The sum of these readings is .1; this is divided by 3 (the interval size), giving .0333 as the computed sliding average value for hour 1. The sliding average program computes the proper decimal code to allow for four significant digits to be output and the computed sliding average value is rounded to four significant digits. Sliding average values are calculated in this manner for the remaining hours of January 1; for hour 14, January 1, the readings for hours 12, 13, and 14 (.6, .8, and .4), give a sum of 1.8, yielding a sliding average value of .6.

For hour 0 of January 2, hours 22 and 23 of January 1 and hour 0 of January 2 are used. Since all three readings are 0, the calculated sliding average value is 0. The readings contain null values (shown as - on the figure) for hours 3 thru 8 of January 2. Since at least two readings must be non-null to calculate a three-interval average, there are not enough readings to calculate a value for hour 4 (hours 2, 3, and 4 are needed, only 2 is non-null). Hour 9 average requires hours 7, 8, and 9, but only 9 is non-null. (For hours 5, 6, 7, and 8 all required readings are missing.) These noncalculable values are shown in Figure 5.3.4-b as *; the actual reading in the output file is 9998 and will be printed as *** in the detailed report.

For the first hour (0) of January 31, the last two readings from the record for January 30 must be used. January 30 was a wraparound record created by the retrieval and contains only null-value readings (as there was no such record on the master file). Thus no value can be calculated for hour 0, since two of the necessary values are null. For hour 1, hour 23 of January 30 (a null reading) plus hours 0 and 1 of January 31 (.5 and .5) are used, giving a sum of 1.0 and a sliding average value of .3333.

Figure 5.3.4-b shows the sliding average values as output by ASTSLAV (AQ0180), with the exception that 9998 is output in the file where * is shown on the figure.

5.3.4.2 File Formats

Two files are input to ASTSLAV (AQ0180): an AQDHS-II sliding average answer file and an option card. The sliding average answer file must be created by the retrieval procedure using the SLIDING mode (see Section

5.2.2.2). The format of this file is the same as that of the standard AQDHS-II master file (see Figure 4.5.3-a).

The option card is used to specify the sliding average interval; for additional information on the options, see Section 5.3.4.3.

The program produces two output files: a sliding average values file and a diagnostic report. The sliding average values file is in the same format as the standard AQDHS-II master file (see Figure 4.5.3-a); it is used by ARPMSTR (AQ0230), the master file detailed report program, to produce the sliding average report. The diagnostic report produced by ASTSLAV (AQ0180) gives run statistics including numbers of input records, output records, and errors. See Figure 5.3.4-c for a sample of this report.

5.3.4.3 Options

An option card must be entered to specify the sliding average interval. The format of this option card is shown in Figure 5.3.4-d. The word AVERAGE is required on the card, followed by a number from 2 to 31. This number indicates the interval (m, or number of readings) for which the sliding average value is to be calculated. As an example, suppose the interval value is three: to calculate a sliding average value, the corresponding input reading plus the previous two input readings (a total of three) are used. Further information on interval size can be found in Section 5.3.4.1.

To calculate the sliding average value for reading n over interval m does not require that all m-1 preceding readings be present in the input file.

Column 21 of the option card allows the user to select whether 75% of the m readings (code S) or (m + 1)/2 readings (code A) are required. If neither option for the required number of readings is specified, or if an invalid value is entered, the default value A is assumed. Figure 5.3.4-e lists, by interval number, the number of readings required for each of these options.

All records read by ASTSLAV (AQ0180) are processed for sliding average values; however, a check is made on the time code of each record to determine if the interval number specified on the option card is greater than the maximum interval size for that time code. A chart of maximum interval size for each time code is shown in Figure 5.3.4-f.

5.3.4.4 Error Messages

ASTSLAV 001 ABORT - ANSWER FILE IS NOT A SLIDING AVERAGE FILE

Meaning: ASTSLAV (AQ0180) can only process a sliding average answer file produced by a SLIDING mode retrieval procedure (see Section 5.2.2.2). Therefore, the run was terminated.

Action: Insure that the input file has been created by the retrieval procedure using the SLIDING option on the $$SELECT card and resubmit the job.

ASTSLAV 002 ABORT - CONTROL CARD MISSING

Meaning: The option card must be included to specify the interval size. The run was terminated.

Action: Input the option card and resubmit the job.

ASTSLAV 003 ABORT - NON-NUMERIC INTERVAL ON CONTROL CARD

Meaning: The interval specified on the option card must be numeric, and must be between the values 2 and 31, inclusive. The run was terminated.

Action: Correct the control card and resubmit the job.

ASTSLAV 004 ABORT - INTERVAL SPECIFIED LESS THAN 2 OR GREATER THAN 31

Meaning: The interval specified on the option card must not be less than 2 or greater than 31. The run was terminated.

Action: Correct the option card and resubmit the job.

ASTSLAV 005 ABORT - SLIDING AVERAGE RECORD REQUIRED

Meaning: The program has found an input record that is not a sliding average record. This can happen if a standard answer file has been concatenated to a sliding average answer file. The run was terminated.

Action: Insure that the input file contains only sliding average file records and resubmit the job.

ASTSLAV 006 ABORT - SLIDING AVERAGE ANSWER FILE CONTAINS NO DATA

Meaning: There were no records in the input file; therefore, the run was terminated. This could have happened because the retrieval specifications were too restrictive and no records were selected; also, the retrieval may have been terminated prior to writing the answer file, or because of an error in the retrieval procedure.

Action: Examine the retrieval specifications and resubmit both the retrieval and sliding average procedures.

ASTSLAV 007 ABORT - SLIDING AVERAGE STATEMENT INVALID OR MISSING

Meaning: The statement identifier AVERAGE is misspelled or missing; therefore, the run was terminated.

Action: Correct the control card and resubmit the job.

ASTSLAV 008 ABORT - SYNTAX REQUIRES NUMERIC PARAMETER BETWEEN 2 AND 31

Meaning: An invalid interval was specified; therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

ASTSLAV 009 CONDITIONAL - INTERVAL SPECIFIED EXCEEDS MAX READINGS - SKIPPING TO NEXT SAMPLE

Meaning: The interval specified exceeds the maximum allowed for the time code. No sliding average values are computed until a record is encountered which has a different Key 1/Key 2 combination. See Figure 5.3.4-f for allowed interval sizes by time code.

Action: If a sliding average is required for the record in questioning, a smaller interval must be specified. For a small answer file, the option card should be changed and the job rerun. For a large answer file, rerun the retrieval, selecting only the skipped records, and then run the sliding average program (with the changed option card) on that answer file.

ASTSLAV 010 CONDITIONAL - OPTION FOR NUMBER OF READINGS REQUIRED INVALID - 50% USED

Meaning: An invalid value has been specified for the required number of readings; therefore, ASTSLAV (AQ0180) was executed using the default value A.

Action: No action is needed unless the SAROAD value of 75% is required; if so, correct the option card and resubmit the job.

5.3.4.5 Cataloged JCL

5.3.4.5.1 JCL listing - The cataloged procedure AQSTM20 executes the sliding average program ASTSLAV (AQ0180). See Figure 5.3.4-g for a listing of this procedure.

5.3.4.5.2 Cross-reference of DD names and files

Program Name: ASTSLAV (AQ0180)

DD Name	File Description	Input/Output
AQSINPUT	Option card	Input
AQSMASTR	AQDHS-II sliding average answer file	Input
AQSVALUE	Sliding average values file	Output
AQSPRINT	Diagnostic report	Output

5.3.4.5.3 User-supplied JCL - To execute the cataloged procedure AQSTM20, the user can expect to supply job accounting information and names of the input sliding average answer file and the output sliding average values file. An option card is required to specify the interval number. See Figure 5.3.4-h for a description of the substitutable parameters for the procedure.

5.3.4.5.4 Sample run stream -The following run stream is from the AQDHS-II baseline test run series. A sliding average answer file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSR42' is input along with an option card specifying an interval of 3 and a default to "A" for the required number of readings. The sliding average values file produced is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ITSLDA43'.

```
//   EXEC  AQSTM20,
//         MSTRFIL=RTANSR42,
//         ANSWRFL=ITSLDA43
// AVERAGE.INPUT DD *
AVERAGE  3
/*
```

The diagnostic report resulting from this run is shown in Figure 5.3.4-c. Costs of this run are shown in Section 5.3.4.7.

5.3.4.6 Warnings and Special Instructions

A sliding average retrieval must be run prior to running ASTSLAV (AQ0180). It is recommended that this retrieval be as specific as possible so that only the desired records are retrieved, thus keeping the cost of running ASTSLAV (AQ0180) down. The master file detailed report program ARPMSTR (AQ0230) must be run after ASTSLAV (AQ0180) to actually print the sliding average report. A specific retrieval will also reduce the quantity of output from ARPMSTR (AQ0230). See Section 7.2.6 for a detailed example showing retrieval, sliding average calculation, and report. Note that the sliding average value file should only be used as input to ARPMSTR (AQ0230); it should not be input to any other program.

The option card indicating the desired averaging interval is required. Insure that this interval number is valid for the time-code of the data on the input file (see Figure 5.3.4-f).

A minimum number of readings in a specified interval is required to compute the sliding average. The value of this minimum is determined by the option card (see Section 5.3.4.3).

5.3.4.7 Cost Considerations

The following estimates reflect the cost of executing the sample run stream in Section 5.3.4.5.4 on an IBM 370/168:

Number of input records:	110 records
Number of output records:	55 records
CPU time:	2.0 seconds
I/O time:	5.3 seconds
Total time:	7.3 seconds
Estimated cost:	$2.30

The cost of running the sliding average program and a subsequent sliding average detailed report can be greatly reduced by making the required initial retrieval as restrictive as possible. Thus, if you are only interested in seeing a sliding average report for SO_2 three-hourly data for January 1979, make all of those requirements part of the retrieval specifications. (See Section 5.3.4.1 for an example of retrieving January 1979 hourly SO_2 data.)

5.3.4.8 Related Programs and Procedures

The retrieval programs ARTLNGP (AQ0110) and ARTGENR (AQ0120) must be run prior to running ASTSLAV (AQ0180). These retrieval programs may be executed using the cataloged procedure AQRTM10 (see Section 5.7) or the cataloged procedures AQRTM20 and AQRTM30 (see Section 5.2). After executing ASTSLAV (AQ0180), the master file detailed report program, ARPMSTR (AQ0230), should be run to print the sliding average report. Details on procedure AQRPM20, which executes ARPMSTR (AQ0230) can be found in Section 6.2.3.5.

1979	HOUR 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Jan. 1	0	.1	0	0	0	0	0	0	0	.1	.4	.4	.6	.8	.4	.4	.5	.5	.2	.1	0	0	0	0
2	0	0	0	-	-	-	-	-	-	.5	.6	.7	.7	.8	1.0	1.1	1.0	1.1	1.0	1.1	.9	.8	.8	.7
31	.5	.5	.6	.7	.7	.6	.6	.6	.8	1.1	1.1	1.3	1.3	1.3	1.4	1.2	1.1	1.1	.9	1.0	.9	.8	.8	.7
Feb. 1	.7	.7	.6	.5	.4	.4	.4	.7	.9	1.0	1.1	1.2	1.4	1.3	1.2	1.2	.8	.7	.7	.7	.7	.7	.8	.7
3	0	0	0	0	0	0	0	0	-	-	-	-	-	0	0	.2	.4	.4	.6	.6	.7	.3	0	0

- indicates the value is null (9999)

Figure 5.3.4-a. Example input - Sliding Average Answer Records

1979	HOUR 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Jan. 1	0	.0333	0	0	0	0	0	0	0	.0333	.1667	.3	.3333	.6	.6	.5333	.4333	.4667	.4	.2667	.1	.0333	0	0
2	0	0	0	0	*	*	*	*	*	*	.3667	.6	.6667	.7333	.8333	.9667	1.033	1.033	1.067	1.0	1.0	9333	.8333	.7667
31	*	.3333	.5333	.6	.6667	.6667	.6333	.6	.6667	.8333	1.0	1.167	1.233	1.3	1.333	1.3	1.233	1.133	1.033	1.0	.9667	.9	.8333	.7333
Feb. 1	.7333	.7	.6667	.6	.5	.4667	.4	.5	.6667	.8667	1.0	1.167	1.2	1.3	1.333	1.3	1.233	1.133	1.033	1.0	.9333	.9	.8333	.7667
3	*	0	0	0	0	0	0	0	0	*	*	*	*	*	0	.0667	.2	.2667	.4667	.5333	.6333	.5333	.3333	.1

* indicates that the sliding average cannot be calculated (9998)

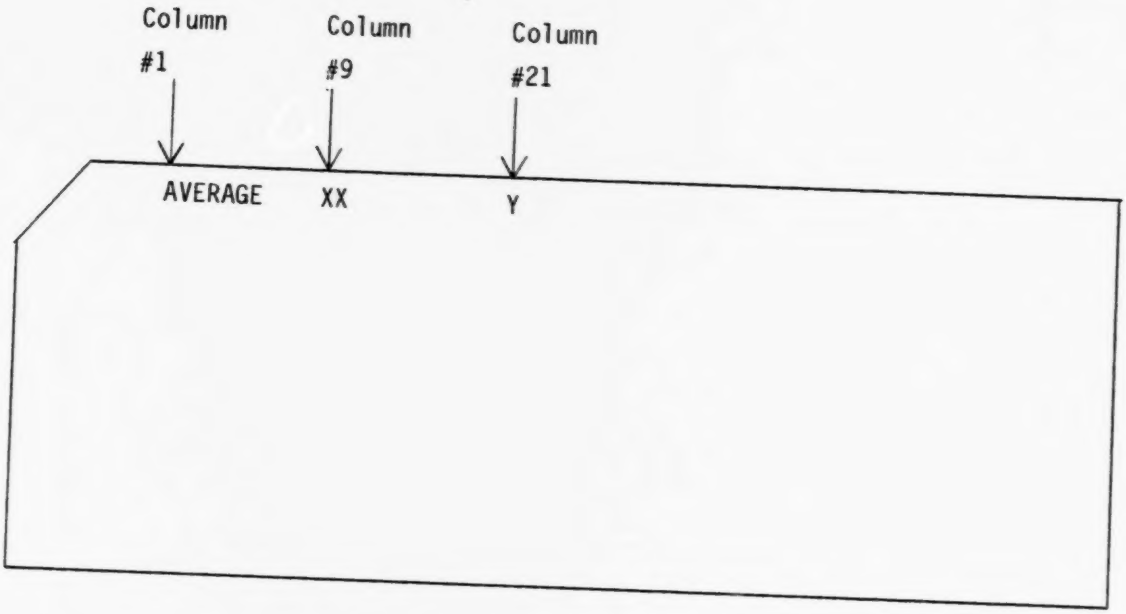
Figure 5.3.4-b. Example Output - Sliding Average Value Records

```
                         AQDHS-II SLIDING AVERAGE PROGRAM  -  DIAGNOSTIC REPORT                        PAGE    1
PROGRAM NAME: ASTSLAV (AQ0180)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

OPTIONS IN EFFECT: AVERAGE 3          A


NUMBER OF SLIDING AVERAGE ANSWER RECORDS READ:             167
NUMBER OF SLIDING AVERAGE VALUE RECORDS WRITTEN:           157
NUMBER OF ERRORS DETECTED:                                   0
```

Figure 5.3.4-c. Diagnostic Report



The options must be specified in the indicated fields, subject to the following rules:

1. XX must be a number (m) between 2 and 31 specifying the interval over which the average is computed.

2. Y specifies the minimum number of readings required. The valid values for Y are:
   S - Use the SAROAD value of 75% of readings required,
   A - Use the AQDHS-II value of (m + 1)/2 readings required where m is the interval size specified in columns 9 and 10.

Figure 5.3.4-d. Option Card Format

Interval	Required # of Readings	
	AQDHS-II Option	SAROAD Option
2	2	1
3	2	2
4	3	3
5	3	3
6	4	4
7	4	5
8	5	6
9	5	6
10	6	7
11	6	8
12	7	9
13	7	9
14	8	10
15	8	11
16	9	12
17	9	12
18	10	13
19	10	14
20	11	15
21	11	15
22	12	16
23	12	17

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Figure 5.3.4-e. Required Number of Readings for Interval Size

Interval	Required # of Readings	
	AQDHS-II Option	SAROAD Option
24	13	18
25	13	18
26	14	19
27	14	20
28	15	21
29	15	21
30	15	22
31	16	23

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Figure 5.3.4-e - Continued. Required Number of Readings for Interval Size

AQDHS-II Time Code	Time Interval	Maximum Interval Size
1	1 hour	24
2	2 hour	12
3	3 hour	8
4	4 hour	6
5	6 hour	4
6	8 hour	3
7	12 hour	2
8	Daily	28,29,30, or 31 depending on month
9	Weekly	5
A	Monthly	12
B	Quarterly	4
C	Composite	Not applicable

Figure 5.3.4-f. Maximum Interval Size By Time Code

```
//*                                                                     00000100
//*    PROCEDURE NAME: AQSTM20                                          00000200
//*    REVISION LEVEL: 1-00                                             00000300
//*    LAST UPDATE #: 24                                                00000400
//*    DATE INCORPORATED: OCTOBER 31,1978                               00000500
//*                                                                     00000600
//*                                                                     00000700
//*    THIS PROCEDURE ALLOWS THE USER TO PRODUCE AN AQDHS-II SLIDING    00000800
//*    AVERAGE VALUES FILE FROM AN AQDHS-II SLIDING AVERAGE ANSWER      00000900
//*    FILE                                                             00001000
//*                                                                     00001100
//*                                                                     00001200
//AQSTM20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',                    00001300
//             PROGRAM=ASTSLAV,                                         00001400
//             TIME1='3,0',                                             00001500
//             ANSRFIL=AQANSSLD,                                        00001600
//             VALUFIL=AQMSTSLD,                                        00001700
//             UNIT=3330,                                               00001800
//             SERIAL=CDHSPK,                                           00001900
//             DISP='NEW,PASS,DELETE',                                  00002000
//             SPCUNIT=TRK,                                             00002100
//             PRIMARY=20,                                              00002200
//             SECNDRY=10,                                              00002300
//             OUT=A                                                    00002400
//*                                                                     00002500
//AVERAGE  EXEC PGM=&PROGRAM,                                           00002600
//             REGION=60K,                                              00002700
//             TIME=(&TIME1)                                            00002800
//*                                                                     00002900
//* COMPUTE SLIDING AVERAGE VALUES FILE FROM                            00003000
//* SLIDING AVERAGE ANSWER FILE                                         00003100
//*                                                                     00003200
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00003300
//             VOLUME=(PRIVATE,RETAIN),                                 00003400
//             DISP=(SHR,PASS)                                          00003500
//          DD DSNAME=SYS1.COBLIB,                                      00003600
//             DISP=(SHR,PASS)                                          00003700
//*                                                                     00003800
//* INPUT DATA SET - SLIDING AVERAGE CALCULATION OPTIONS                00003900
//*                                                                     00004000
//AQSINPUT  DD DDNAME=OPTIONS,                                          00004100
//             DCB=BLKSIZE=80                                           00004200
//*                                                                     00004300
//* INPUT DATA SET - SLIDING AVERAGE ANSWER FILE                        00004400
//*                                                                     00004500
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&ANSRFIL,                          00004600
//             DISP=(SHR,PASS),                                         00004700
//             VOLUME=(PRIVATE,RETAIN)                                  00004800
//*                                                                     00004900
//* OUTPUT DATA SET - SLIDING AVERAGE VALUES FILE                       00005000
//*                                                                     00005100
//AQSVALUE  DD DISP=(&DISP),                                            00005200
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),                     00005300
//             UNIT=&UNIT,                                              00005400
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),               00005500
//             DSNAME=&PROJECT..DATA.&VALUFIL                           00005600
//*                                                                     00005700
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00005800
```

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Figure 5.3.4-g. Cataloged Procedure AQSTM20

```
//*                                                                     00005900
//AQSPRINT  DD SYSOUT=&OUT                                              00006000
//*                                                                     00006100
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006200
//*                                                                     00006300
//SYSPRINT  DD SYSOUT=&OUT                                              00006400
//*                                                                     00006500
//SYSOUT    DD SYSOUT=&OUT                                              00006600
//*                                                                     00006700
//SYSDBOUT  DD SYSOUT=&OUT                                              00006800
//*                                                                     00006900
//SYSDTERM  DD SYSOUT=&OUT                                              00007000
//*                                                                     00007100
//SYSUDUMP  DD SYSOUT=&OUT                                              00007200
//*                                                                     00007300
```

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Figure 5.3.4-g - continued. Cataloged Procedure AQSTM20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS"	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSRAA would be the full data set name of an AQDHS-II answer file)
PROGRAM	ASTSLAV	Sliding average program
TIME1	'3,0'	Time (in minutes, seconds) allocated for execution of ASTSLAV
MSTRFIL	AQANSSLD	Lowest-level index of sliding average answer file
ANSWRFL	AQMSTSLD	Lowest-level index of sliding average values file
UNIT	3330	Unit type to which output sliding average values file is to be written
SERIAL	CDHSPK	Volume serial ID to which sliding average values file is to be written
DISP	'NEW, PASS, DELETE'	Disposition of sliding average values file
SPCUNIT	TRK	Units in which space is to be allocated for the sliding average values file
PRIMARY	20	Primary space allocation for sliding average values file
SECNDRY	10	Secondary space allocation for sliding average values file
OUT	A	SYSOUT class for all print files

Figure 5.3.4-h. Substitutable Parameters for AQSTM20

5.4 AQDHS-II MASTER FILE ARCHIVAL AND MERGING

5.4.1 INTRODUCTION

The master file archival program, AMSARCH (AQ0215), provides the AQDHS-II user with the capability to archive data from the master file. Archival of data is advisable if the master file contains data that no longer requires updating and/or is not generally included in reports produced from the master file. By archiving this static data, the user reduces the size of the active (or volatile) master file and thereby reduces the cost of storing and processing the active master file.

The master file archival flowchart is shown in Figure 5.4.1-a. AMSARCH (AQ0215) separates the records in the input master file into two classes: records containing data prior to or equal to the date specified on the option card and records containing data after the date specified on the option card. Records of the former type are written to the archived master file whereas records of the latter type are written to the new (active) master file.

Closely related to the process of archiving data from the master file is the process of merging two distinct master files. The master file merge program, AMSMERG (AQ0210) provides the AQDHS-II user with the capability to merge two distinct master files.

One example of the use of AMSMERG (AQ0210) is the merging of two archived master files. Suppose that an archived master file has been created that contains all data prior to or equal to 1971 and that the active file contains all data from 1972 or later. To archive 1972 data, the active master file would be input to AMSARCH (AQ0215) with the appropriate option card, producing the new active master file containing all data dated after 1972 and an archived master file containing all 1972 data. Then the two archived master files (1971 and prior, and 1972 files) would be input to AMSMERG

(AQ0210) to produce an archived master file containing all data prior to or equal to 1972.

Two examples of the use of AMSMERG (AQ0210) are the merging of the archived and active master files and the merging of answer files that were extracted from the archived and active master files. Suppose the archived master file contains all data prior to or equal to 1972 and the active master file contains all data after 1972. To produce a report for all sulfur dioxide data for the years 1971 through 1974, a retrieval (see Section 5.2) could be run against both the archived and active master files to select 1971 through 1974 sulfur dioxide data. Then the two answer files would be input to AMSMERG (AQ0210) to produce a merged answer file which would in turn be used to produce the desired report.

The master file merge flowchart is shown in Figure 5.4.1-b. AMSMERG (AQ0210) merges the two input master files into one output master file and produces a diagnostic report.

Detailed discussions of AMSMERG (AQ0210) and AMSARCH (AQ0215) are in Sections 5.4.2 and 5.4.3, respectively.

AMSARCH (AQ0215) may be executed using the cataloged procedure AQMSM20, which is discussed in Section 5.4.3.5. A sample job stream to archive data from the master file is shown in Section 5.4.3.5.4.

AMSMERG (AQ0210) may be executed using the cataloged procedure AQMSM10, which is discussed in Section 5.4.2.5. A sample job stream to merge two distinct master files is shown in Section 5.4.2.5.4.

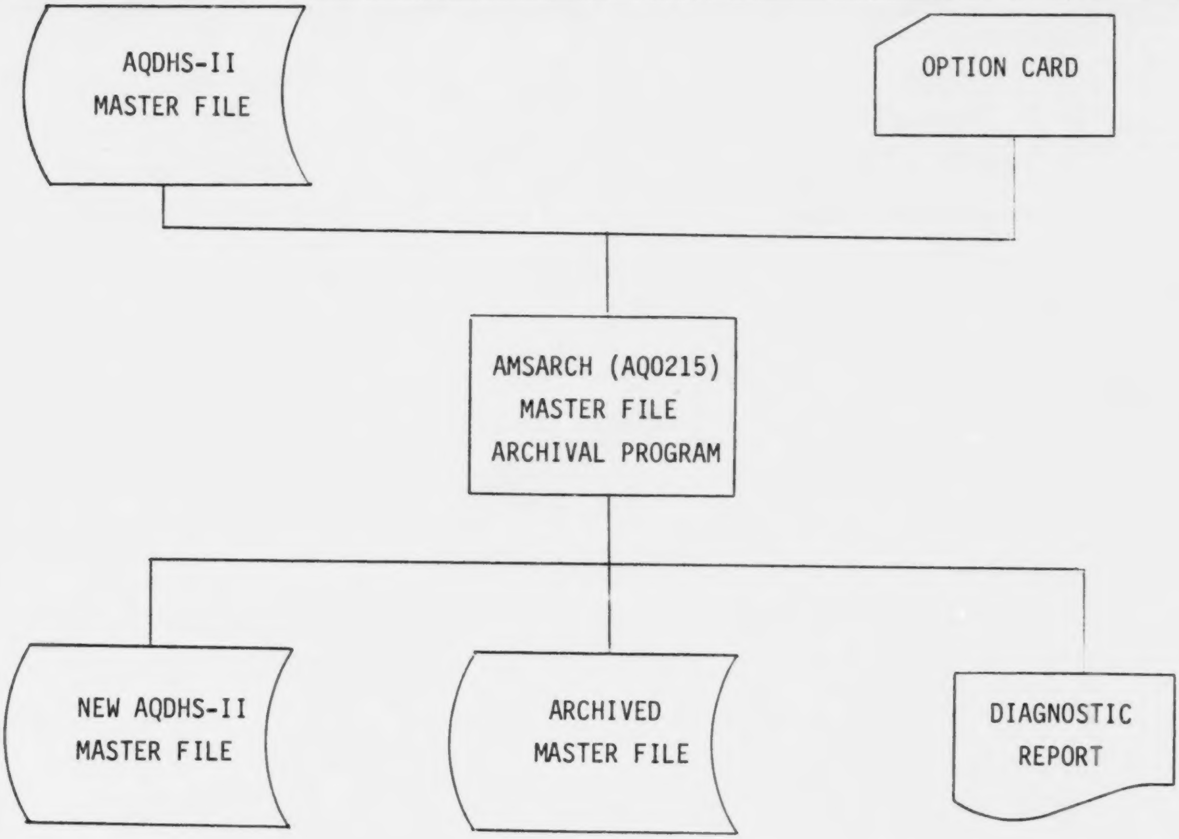


Figure 5.4.1-a. Master File Archival Flowchart

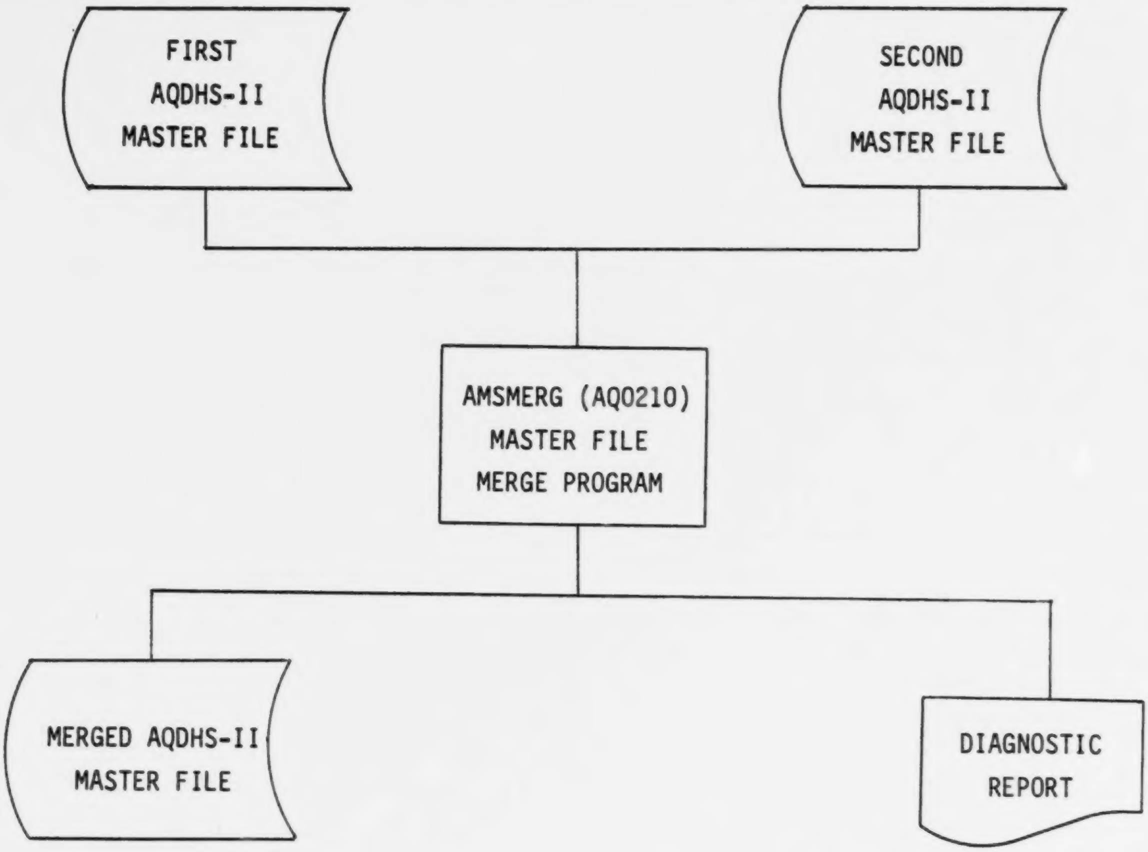

FIRST AQDHS-II MASTER FILE
SECOND AQDHS-II MASTER FILE
AMSMERG (AQ0210) MASTER FILE MERGE PROGRAM
MERGED AQDHS-II MASTER FILE
DIAGNOSTIC REPORT

Figure 5.4.1-b. Master File Merge Flowchart

5.4.2 MASTER FILE MERGE PROGRAM - AMSMERG (AQ0210)

5.4.2.1 Description

AMSMERG (AQ0210) creates a single AQDHS-II master file from two separate AQDHS-II master files. The two input master files can also be answer files produced by a retrieval, archived master files, or any other combination of two files in master file format; however, the files must not contain records that have identical keys and they must be in correct master file sequence. The merged AQDHS-II master file will contain all the records from both files and it will be in correct master file sequence.

5.4.2.2 File Formats

The input to AMSMERG (AQ0210) consists of two separate AQDHS-II master files in correct master file sequence. See Figure 4.5.3-a for the master file format.

AMSMERG (AQ0210) produces an AQDHS-II master file (in correct master file sequence) and a diagnostic report. The diagnostic report consists of the update messages and the input and output file record counts. A sample of the diagnostic report is shown in Figure 5.4.2-a.

5.4.2.3 Options

There are no options.

5.4.2.4 Error Messages

AMSMERG 001 ABORT - IDENT KEY='identification key' IS FOUND ON BOTH FILES

Meaning: Records with identical keys were found in both files and program execution was terminated.

Action: Delete the undesired duplicate record from one of the input files and resubmit the job.

AMSMERG 002 ABORT - FILE #1 OUT OF SEQUENCE

Meaning: Input file #1 is out of sequence or contains records with duplicate keys. Therefore, program execution was terminated.

Action: Sort input file #1 into the proper sequence using program ASRMSTR (AQ0140). Verify that there are no records with duplicate keys in the file. If there are, correct the error and resubmit the job.

AMSMERG 003 ABORT - FILE #2 OUT OF SEQUENCE

Meaning: Input file #2 is out of sequence or contains records with duplicate keys. Therefore, program execution was terminated.

Action: Sort input file #2 into the proper sequence using program ASRMSTR (AQ0140). Verify that there are no records with duplicate keys in the file. If there are, correct the error and resubmit the job.

5.4.2.5 Cataloged JCL

5.4.2.5.1 JCL listing - AMSMERG (AQ0210) can be run by executing the cataloged procedure AQMSM10. See Figure 5.4.2-b for a listing of this procedure.

5.4.2.5.2 Cross-reference of DD names and files

Program Name: AMSMERG (AQ0210)

DD Name	File Description	Input/Output
OLDAQ1	Input AQDHS-II master file #1	Input
OLDAQ2	Input AQDHS-II master file #2	Input
NEWMSTR	Merged AQDHS-II master file	Output
AQSPRINT	Diagnostic report	Output

5.4.2.5.3 User-supplied JCL - The user must specify the data set names of the input and output master files. See Figure 5.4.2-c for a description of the procedure's substitutable parameters.

5.4.2.5.4 Sample run stream - The following run stream would produce the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.NEWMSTR' from the input master files 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSR07' and 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSR08':

```
// EXEC AQMSM10,
//       INFILE1=RTANSR07,
//       INFILE2=RTANSR08,
//       NEWMSTR=NEWMSTR
```

5.4.2.6 Warnings and Special Instructions

AMSMERG (AQ0210) checks each input AQDHS-II master file for proper master file sequence and duplicate record keys. If there is a sequence error or a duplicate record key, a message will be printed indicating which input file the error occurred in and program execution will be terminated. In addition to the sequence check of each input file, there is a sequence check that compares the record keys from each input file to determine if there are duplicate records in the files. If duplicate records are present, an error message will be printed and program execution will be terminated.

5.4.2.7 Cost Considerations

An run of AMSMERG (AQ0210) was executed on an IBM 370/168 using two input test master files. The following estimates are from that test run:

Input master file #1:	291 records
Input master file #2:	20 records
Merged master file:	311 records
CPU time:	0.3 seconds
I/O time:	5.3 seconds
Total time:	5.6 seconds
Estimated cost:	$1.32

5.4.2.8 Related Programs and Procedures

See Section 5.4.3 Master File Archival Program AMSARCH (AQ0215).

```
                        AQDHS-II MASTER FILE MERGE PROGRAM  -  DIAGNOSTIC REPORT                         PAGE  1
PROGRAM NAME: AMSMERG (AQ0210)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

INPUT FILE 1 CONTAINS:            2 RECORDS
INPUT FILE 2 CONTAINS:            2 RECORDS
OUTPUT FILE CONTAINS:             4 RECORDS
```

Figure 5.4.2-a. Diagnostic Report

```
//*
//*   PROCEDURE NAME: AQMSM10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO MERGE TWO DISTINCT AQDHS-II
//*   MASTER FILES
//*
//*
//AQMSM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=AMSMERG,
//             REGION1=80K,
//             INFILE1=AQMSTARC,
//             INFILE2=AQMSTWRK,
//             NEWMSTR=AQNEWMST,
//             DISP1='SHR,PASS',
//             DISP2='SHR,PASS',
//             DISP3='NEW,CATLG,DELETE',
//             OUT=A,
//             UNIT=3330,
//             VOL=CDHSPK,
//             TIME1='1,0',
//             SPUNIT=TRK,
//             PRI=20,
//             SEC=10
//*
//*
//MERGE   EXEC PGM=&PROGRAM,
//             TIME=(&TIME1),
//             REGION=&REGION1
//*
//*  MERGE TWO AQDHS-II MASTER FILES
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             DISP=(SHR,PASS),
//             VOLUME=(PRIVATE,RETAIN)
//          DD DSN=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - AQDHS-II MASTER FILE
//*
//OLDAQ1    DD DSN=&PROJECT..DATA.&INFILE1,
//             DISP=(&DISP1),
//             VOLUME=(PRIVATE,RETAIN)
//*
//*  INPUT DATA SET - AQDHS-II MASTER FILE
//*
//OLDAQ2    DD DSN=&PROJECT..DATA.&INFILE2,
//             DISP=(&DISP2),
//             VOLUME=(PRIVATE,RETAIN)
//*
//*  OUTPUT DATA SET - MERGED AQDHS-II MASTER FILE
//*
//NEWMSTR   DD DSN=&PROJECT..DATA.&NEWMSTR,
//             VOL=SER=&VOL,
//             UNIT=&UNIT,
//             SPACE=(&SPUNIT,(&PRI,&SEC),RLSE),
```

Figure 5.4.2-b Cataloged Procedure AQMSM10 (page 1 of 2)

```
//             DISP=(&DISP3)                                            00005900
//*                                                                     00006000
//*  OUTPUT DATA SET - DIAGNOSTIC MESSAGES                              00006100
//*                                                                     00006200
//AQSPRINT  DD SYSOUT=&OUT                                              00006300
//*                                                                     00006400
//*  OUTPUT DATA SETS - SYSTEM OPERATION                                00006500
//*                                                                     00006600
//SYSPRINT  DD SYSOUT=&OUT                                              00006700
//*                                                                     00006800
//SYSOUT    DD SYSOUT=&OUT                                              00006900
//*                                                                     00007000
//SYSDBOUT  DD SYSOUT=&OUT                                              00007100
//*                                                                     00007200
//SYSDTERM  DD SYSOUT=&OUT                                              00007300
//*                                                                     00007400
//SYSUDUMP  DD SYSOUT=&OUT                                              00007500
//*                                                                     00007600
```

Figure 5.4.2-b Cataloged Procedure AQMSM10 (page 2 of 2)

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. NEWMSTR would be the full data set name of an AQDHS-II master file)
PROGRAM	AMSMERG	Master file merge program
REGION1	80K	Region size allocated for execution of AMSMERG
INFILE1	AQMSTARC	Lowest-level index of input master file #1
INFILE2	AQMSTWRK	Lowest-level index of input master file #2
NEWMSTR	AQNEWMST	Lowest-level index of merged master file
OUT	A	SYSOUT class for all print files
UNIT	3330	Unit type to which merged master file is to be written
VOL	CDHSPK	Volume ID to which merged master file is to be written
TIME1	'1,0'	Time allocated for execution of AMSMERG
SPUNIT	TRK	Units in which space for merged master file is to be allocated
PRI	20	Primary space allocation for merged master file
SEC	10	Secondary space allocation for merged master file
DISP1	'SHR,KEEP'	Disposition of input master file #1
DISP2	'SHR,KEEP'	Disposition of input master file #2
DISP3	'NEW,CATLG,DELETE'	Disposition of merged master file

Figure 5.4.2-c. Substitutable Parameters for AQMSM10

5.4.3 MASTER FILE ARCHIVAL PROGRAM - AMSARCH (AQ0215)

5.4.3.1 Description

AMSARCH (AQ0215) creates two distinct master files from an input AQDHS-II master file: a new AQDHS-II master file and an archived AQDHS-II master file. Record selection for the output master files is based on an option date supplied by the user. Master file records are selected for the new master file if the date of the master file record is greater than or equal to the specified option date; otherwise, the record is selected for the archived master file.

AMSARCH (AQ0215) allows the user to reduce the size of his working master file by archiving the oldest year(s) of data. By reducing the size of the master file, the user will reduce operating expenses as well as the run time of all programs that access this file.

5.4.3.2 File Formats

Input to AMSARCH (AQ0215) consists of a master file and an option card. See Figure 4.5.3-a for the format of the master file.

AMSARCH (AQ0215) produces a new master file, an archived master file, and a diagnostic report. A sample diagnostic report is shown in Figure 5.4.3-a.

5.4.3.3 Options

The user must enter an option card specifying the option date. This date is a two-digit number representing the beginning year for records in the new master file; no records from the beginning of the specified option year through the current year will be archived.

The option date must appear in columns 1 and 2 of the option card; it must be numeric and greater than 59. If the option date is invalid, or if no option card is submitted, an error message will be printed and program execution will be terminated. See Figure 5.4.3-b for the option card format.

5.4.3.4 Error Messages

*** AMSARCH 001 ABORT - INVALID YEAR SPECIFIED

Meaning: Either no option card is present, or the specified option date is not numeric or not greater than 59. Therefore, the run was terminated.

Action: Correct the error and resubmit the job.

5.4.3.5 Cataloged JCL

5.4.3.5.1 JCL listing - AMSARCH (AQ0215) can be run by executing the cataloged procedure AQMSM20. See Figure 5.4.3-c for a listing of this procedure.

5.4.3.5.2 Cross-reference of DD names and files

Program Name: AMSARCH (AQ0215)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSINPUT	Option card	Input
AQSARCMS	Archived AQDHS-II master file	Output
AQSNEWMS	New AQDHS-II master file	Output
AQSPRINT	Diagnostic report	Output

5.4.3.5.3 User-supplied JCL - The user must specify the data set names for the input master file, the new master file, and the archived master file. The user must also enter an option card specifying the option date. See Figure 5.4.3-d for a description of the procedure's substitutable parameters.

5.4.3.5.4 Sample run stream -The following run stream from the AQDHS-II baseline test run series produces the new AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.NEWMF1' and the archived master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ARCMF1' from the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FTMSTRAA'.

```
// EXEC AQMSM20,
//      MSTRFIL=FTMSTRAA,
//      NEWMSTR=NEWMF1,
//      ARCMSTR=ARCMF1
//ARCHIVE.OPTIONS  DD  *
77
/*
```

5.4.3.6 Warnings and Special Instructions

Since the option date is the only criterion for archiving master file records, the user must submit a valid option card with the execution deck. If no option card or an invalid option card is submitted, program execution will be terminated.

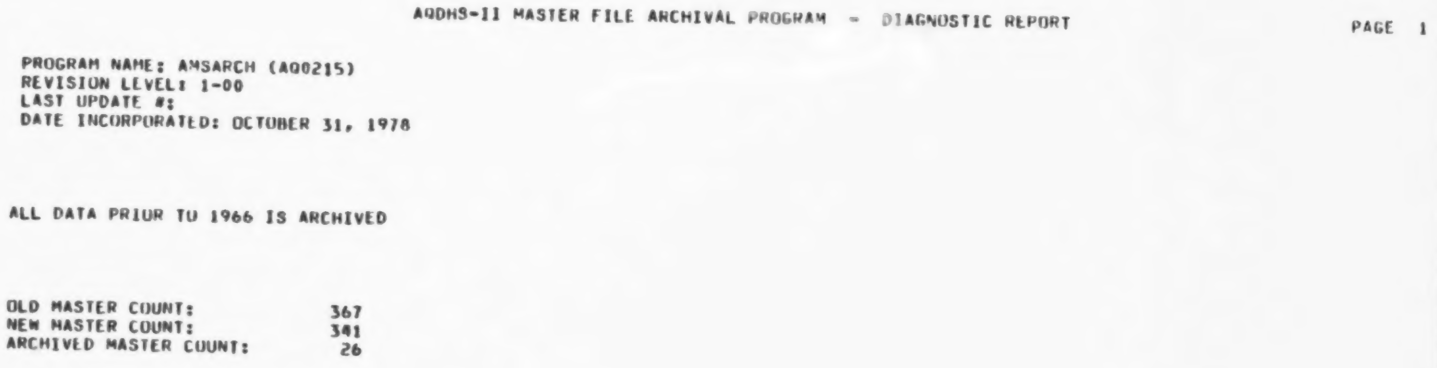
5.4.3.7 Cost Considerations

A test run of AMSARCH (AQ0215) was executed on an IBM 370/168 using a test AQDHS-II master file as input. The following estimates are from that test run:

Input AQDHS-II master file:	291 records
New AQDHS-II master file:	5 records
Archived AQDHS-II master file:	286 records
CPU time:	0.5 seconds
I/O time:	6.0 seconds
Total time:	6.5 seconds
Estimated cost:	$1.45

5.4.3.8 Related Programs and Procedures

The master file merge program, AMSMERG (AQ0210), can be executed to merge an archived master file with a working master file whenever the user needs to access the complete data set. AMSMERG (AQ0210) can also be executed to merge a newly archived master file with a previously archived master file. See Section 5.4.2 for a discussion of AMSMERG (AQ0210).



```
                  AQDHS-II MASTER FILE ARCHIVAL PROGRAM  -  DIAGNOSTIC REPORT                          PAGE  1
 PROGRAM NAME: AMSARCH (AQ0215)
 REVISION LEVEL: 1-00
 LAST UPDATE #:
 DATE INCORPORATED: OCTOBER 31, 1978



ALL DATA PRIOR TO 1966 IS ARCHIVED



OLD MASTER COUNT:             367
NEW MASTER COUNT:             341
ARCHIVED MASTER COUNT:         26
```

Figure 5.4.3-a. Diagnostic Report

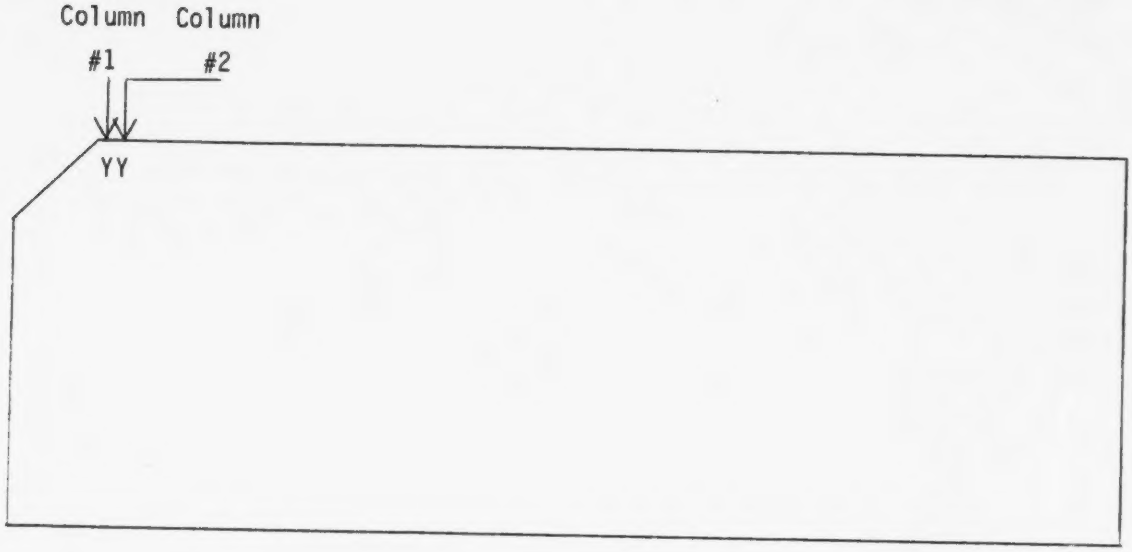


Figure 5.4.3-b. Option Card Format

```
//*
//*   PROCEDURE NAME: AQMSM20
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO ARCHIVE A PERIOD OF DATA
//*   FROM THE AQDHS-II MASTER FILE
//*
//*
//AQMSM20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//            PROGRAM=AMSARCH,
//            REG=100K,
//            MSTRFIL=AQMASTER,
//            NEWMSTR=AQMSTWRK,
//            ARCMSTR=AQMSTARC,
//            UNIT1=3330,
//            UNIT2=3330,
//            SER1=CDHSPK,
//            SER2=CDHSPK,
//            DISP1='NEW,CATLG,DELETE',
//            DISP2='NEW,CATLG,DELETE',
//            SPCUNIT=TRK,
//            PRI1=10,
//            SEC1=10,
//            PRI2=10,
//            SEC2=10,
//            OUT=A
//*
//ARCHIVE EXEC PGM=&PROGRAM,
//            REGION=&REG,
//            TIME=(1,0)
//*
//* ARCHIVE DATA FROM THE MASTER FILE
//*
//STEPLIB  DD DSNAME=&PROJECT..LOAD,
//            VOLUME=(PRIVATE,RETAIN),
//            DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - OPTION CARD
//*
//AQSINPUT DD DDNAME=OPTIONS,
//            DCB=BLKSIZE=80
//*
//*  INPUT DATA SET - CURRENT MASTER FILE
//*
//AQSMASTR DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//            VOLUME=(PRIVATE,RETAIN),
//            DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - ARCHIVED MASTER FILE
//*
//AQSARCMS DD UNIT=&UNIT1,
//            VOLUME=(PRIVATE,RETAIN,SER=&SER1),
//            DISP=(&DISP1),
//            SPACE=(&SPCUNIT,(&PRI1,&SEC1),RLSE),
//            DSNAME=&PROJECT..DATA.&ARCMSTR
//*
```

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Figure 5.4.3-c. Cataloged Procedure AQMSM20

```
//*  OUTPUT DATA SET - NEW MASTER FILE
//*
//AQSNEWMS DD UNIT=&UNIT2,
//             VOLUME=(PRIVATE,RETAIN,SER=&SER2),
//             DISP=(&DISP2),
//             SPACE=(&SPCUNIT,(&PRI2,&SEC2),RLSE),
//             DSNAME=&PROJECT..DATA.&NEWMSTR
//*
//*  OUTPUT DATA SET - MESSAGES
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//*  OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT DD SYSOUT=&OUT
//*
//SYSUDUMP DD SYSOUT=&OUT
//*
//SYSDROUT DD SYSOUT=&OUT
//*
//SYSDTERM DD SYSOUT=&OUT
//*
//SYSOUT   DD SYSOUT=&OUT
//*
```

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Figure 5.4.3-c - continued. Cataloged Procedure AQMSM20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER would be the name of the AQDHS-II master file)
PROGRAM	AMSARCH	Program to archive an AQDHS-II master file
REG	100K	Region size allocated for execution of AMSARCH
MSTRFIL	AQMASTER	Lowest-level index of input AQDHS-II master file
NEWMSTR	AQMSTWRK	Lowest-level index of new AQDHS-II master file
ARCMSTR	AQMSTARC	Lowest-level index of archived AQDHS-II master file
UNIT1	3330	Unit type to which archived AQDHS-II master file is to be written
UNIT2	3330	Unit type to which new AQDHS-II master file is to be written
SERIAL1	CDHSPK	Volume ID to which archived AQDHS-II master file is to be written
SERIAL2	CDHSPK	Volume ID to which new AQDHS-II master file is to be written
DISP1	'NEW,CATLG,DELETE'	Disposition of archived AQDHS-II master file
DISP2	'NEW,CATLG,DELETE'	Disposition of new AQDHS-II master file
SPCUNIT	TRK	Units in which space is to be allocated for archived AQDHS-II master file
PRI1	10	Primary space allocation for archived AQDHS-II master file

(Page 1 of 2)

Figure 5.4.3-d. Substitutable Parameters for AQMSM20

Parameter Name	Default Value	Description
PRI2	10	Primary space allocation for new AQDHS-II master file
SEC1	10	Secondary space allocation for archived AQDHS-II master file
SEC2	10	Secondary space allocation for new AQDHS-II master file
OUT	A	SYSOUT class for all print files

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Figure 5.4.3-d - Continued. Substitutable Parameters for AQMSM20

5.5 FILE CONVERSION

5.5.1 INTRODUCTION

There are five AQDHS-II programs whose primary purpose is the conversion of files: the SAROAD to AQDHS-II conversion program, ACVSARD (AQ0010); the master file COBOL to FORTRAN format conversion program, ACVMFOR (AQ0020); the parameter file COBOL to FORTRAN format conversion program, ACVPFOR (AQ0030); the anomaly screening master file conversion program, ACVANOM (AQ0040); and the units code conversion program, ACVUNIT (AQ0050).

ACVSARD (AQ0010) and ACVANOM (AQ0040) are always executed in conjunction with particular AQDHS-II programs to accomplish specific purposes. ACVSARD (AQ0010) is executed when SAROAD format transactions are to be used to create or update the AQDHS-II master file. The relation of ACVSARD (AQ0010) to the maintenance of the master file is discussed in Section 4.1.4. A detailed discussion of ACVSARD (AQ0010) is presented in Section 5.5.2. ACVANOM (AQ0040) is executed when the master file is to be screened for anomalous readings. The relation of ACVANOM (AQ0040) to the master file anomaly screening process is discussed in Section 6.4.1. A detailed discussion of ACVANOM (AQ0040) is presented in Section 5.5.5.

ACVMFOR (AQ0020) and ACVPFOR (AQ0030) are included in the AQDHS-II system solely for the benefit of those users who have user-written programs coded in FORTRAN that access data from the master file and/or parameter file; neither of these programs is used elsewhere in AQDHS-II. Both ACVMFOR (AQ0020) and ACVPFOR (AQ0030) produce FORTRAN-compatible files; that is, files which may be input to programs coded in ANS FORTRAN.

The COBOL to FORTRAN format conversion flowcharts for the master file and parameter file are shown in Figures 5.5.1-a and 5.5.1-b, respectively. ACVMFOR (AQ0020) converts the master file to FORTRAN-compatible format and

ACVPFOR (AQ0030) converts the parameter file to FORTRAN-compatible format; both programs produce a diagnostic report.

Detailed discussions of ACVMFOR (AQ0020) and ACVPFOR (AQ0030) are presented in Sections 5.5.3 and 5.5.4, respectively.

ACVMFOR (AQ0020) may be executed using the cataloged procedure AQCVM10, which is discussed in Section 5.5.3.5. A sample run stream to convert the master file to FORTRAN-compatible format is presented in Section 5.5.3.5.4. ACVPFOR (AQ0030) may be executed using the cataloged procedure AQCVP10, which is discussed in Section 5.5.4.5. A sample run stream to convert the parameter file to FORTRAN-compatible format is presented in Section 5.5.4.5.4.

ACVUNIT (AQ0050) is used to change the units in which the readings in the master file or in any answer file are expressed. All readings in the input master or answer file may be converted to either standard units or user-specified units, as defined in the parameter file. The file with the converted readings has the same format as the master file and may, therefore, be used to produce any AQDHS-II report. For example, the user could produce a statistical analysis of a specific pollutant for a given year in standard units by retrieving all data for the pollutant and year, then processing the retrieved data through ACVUNIT (AQ0050) before producing the statistical analysis report.

The units code conversion flowchart is shown in Figure 5.5.1-c. ACVUNIT (AQ0050) converts the units in the master file or in any answer file to either standard units or user-specified units, depending upon the option specified. It also produces a diagnostic report. The parameter file is accessed for the appropriate conversion factors, thus accuracy and completeness of the parameter file is of paramount importance. Note that the output answer file with converted readings may be out of the normal master file sort order because the units code has been changed.

A detailed discussion of ACVUNIT (AQ0050) is presented in Section 5.5.6.

ACVUNIT (AQ0050) can be executed using the cataloged procedure AQCVM20, which is discussed in Section 5.5.6.5. A sample run stream to convert the units of a master file is shown in Section 5.5.6.5.4.

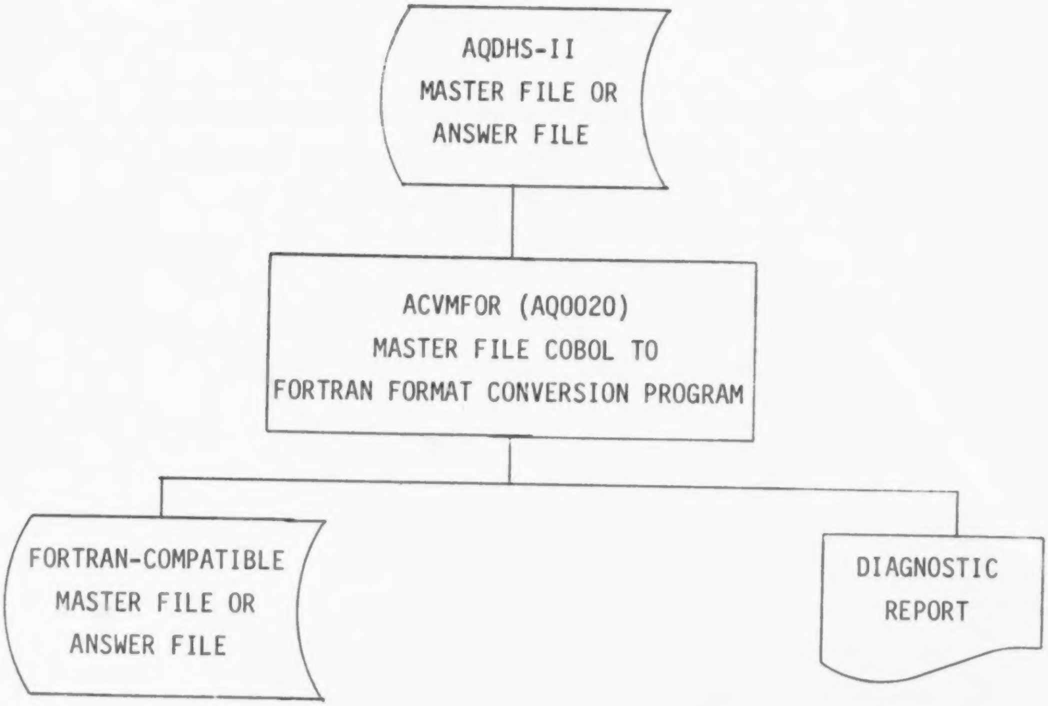

Figure 5.5.1-a. Master File COBOL to FORTRAN Format Conversion Flowchart

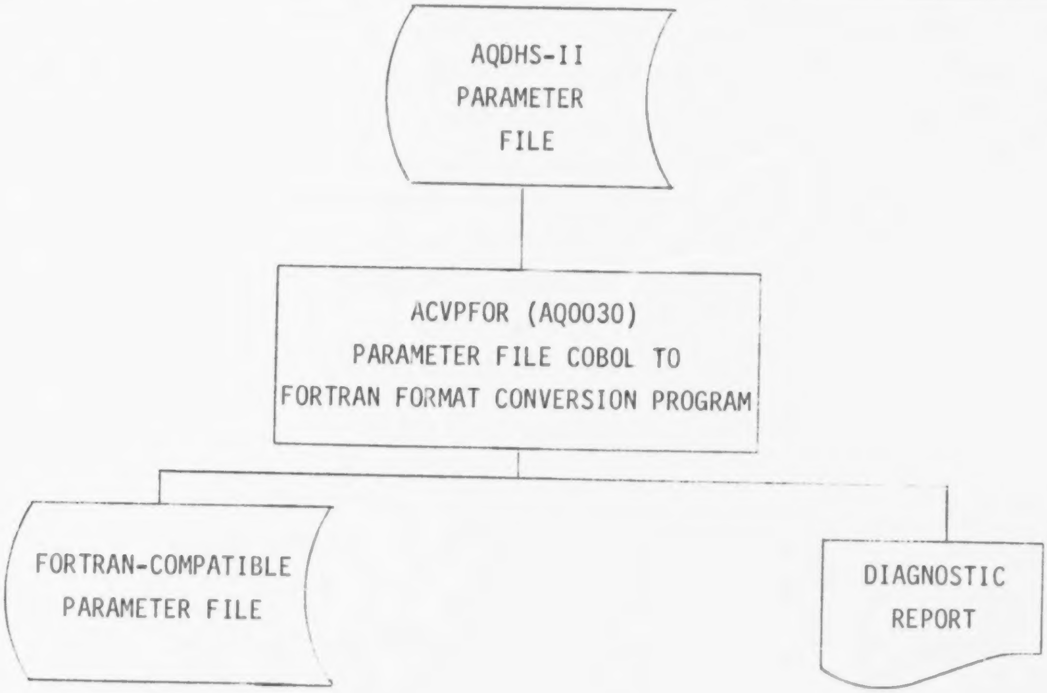

Figure 5.5.1-b. Parameter File COBOL to FORTRAN Format Conversion Flowchart

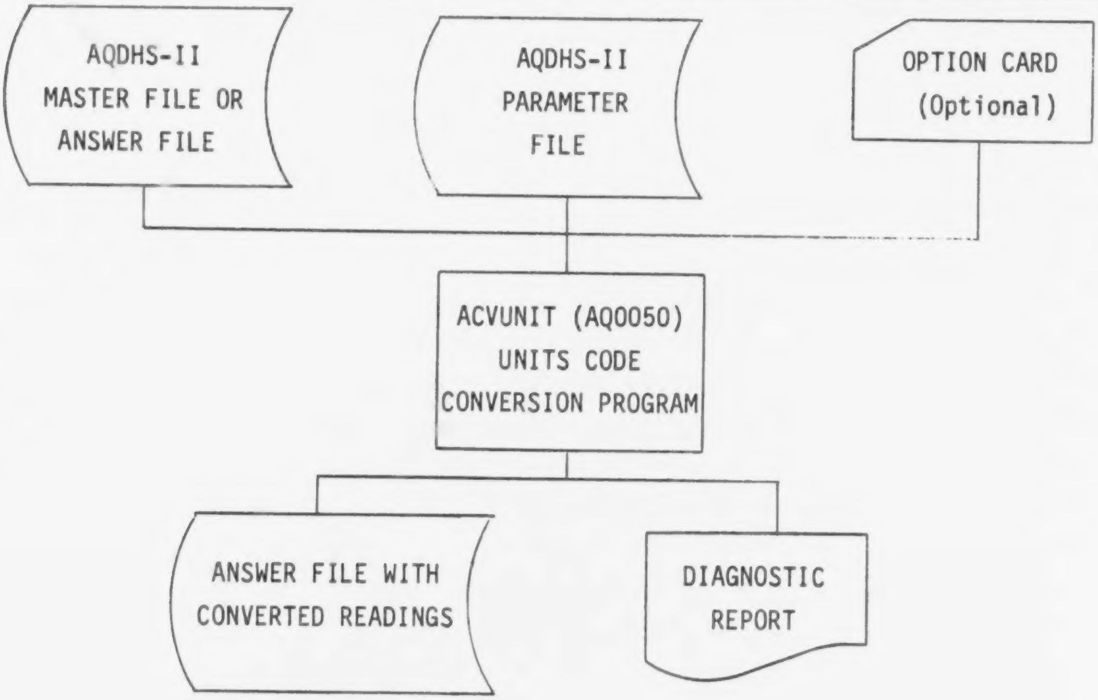

Figure 5.5.1-c. Units Code Conversion Flowchart

5.5.2 SAROAD TO AQDHS-II CONVERSION PROGRAM - ACVSARD (AQ0010)

5.5.2.1 Description

ACVSARD (AQ0010) converts SAROAD transactions to AQDHS-II transactions. There are three formats for the SAROAD transactions: Form 1, Form 2, and Form 3. Figure 5.5.2-a describes these formats. The Form 1 transactions are used to enter hourly data, the Form 2 transactions to enter daily or multiple-parameter data, and the Form 3 transactions to enter multiple-station data. The Form 2 transactions can also be used to enter composite data. These SAROAD formats correspond to the AQDHS-II Form 1, Form 2, and Form 3 transactions, so that a SAROAD transaction is converted to its respective AQDHS-II transaction. The SAROAD transactions, unlike the AQDHS-II transactions, do not have individual action codes; an action card precedes each group of transactions to indicate whether they are add, change, or delete transactions. Once the transactions have been converted to AQDHS-II format, they can be edited and used to update the AQDHS-II master file. Those users who code their input transactions on SAROAD load sheets must use ACVSARD (AQ0010) to convert those transactions before they are input to the master file transaction edit program AEDMSTR (AQ0060).

5.5.2.2 File Formats

There are two input files to ACVSARD (AQ0010). The first is the file containing the SAROAD transactions. The formats for these transactions are given in Figure 5.5.2-a, and descriptions of each field are given in Figure 5.5.2-b. See Appendix D for samples of the SAROAD load sheets.

The SAROAD action card (see Figure 5.5.2-c) is used to indicate the action code to be used for the transactions following that action card. It consists of an identifier and a one-digit action code. The identifier is always '$'; the action code can be either 1 (delete), 2 (add), or 3 (change). More than one action card can be used in a single run of ACVSARD (AQ0010); an action code is in effect for all SAROAD transactions following it until another action card is read. A value of 4 for the action code indicates that the status flag code should be set to 'S', implying that the transactions have already been sent to SAROAD. The $4 action card should only be used in conjunction with a $2 (add) action card and is in effect for the remainder of the program execution.

The second input file is an option card (see Figure 5.5.2-d). This card allows the user to specify whether the transactions are to be listed (LIST option) or not (NOLIST option). See Section 5.5.2.3 for further information on the options.

ACVSARD (AQ0010) produces two output files. The first is a file containing the AQDHS-II format transactions which have been converted from the input SAROAD transactions. The formats for the AQDHS-II transactions can be seen in Figure 4.5.1-a. A diagnostic report is also produced; see Figure 5.5.2-e for an example of this report.

5.5.2.3 Options

The user enters an option card to determine whether or not a confirmation listing of the transactions will be printed. If the LIST option is specified, a listing of each input SAROAD transaction and the corresponding AQDHS-II transaction will be produced. If the NOLIST option is specified, no listing will be produced. See Figure 5.5.2-d for the format of the option card.

If the option card is omitted, or if the option is invalid, the default option NOLIST will be in effect.

5.5.2.4 Error Messages

ACVSARD 001 ERROR - INVALID ACTION CODE, SKIPPING TO NEXT ACTION CARD

Meaning: The only valid action codes are 1 (delete), 2 (add), 3 (change), and 4 (sent). All transactions are read and ignored until a valid action card is read.

Action: If the transactions were not processed correctly due to this error, correct the action card and resubmit the job.

ACVSARD 002 ERROR - NON-NUMERIC ACTION CODE, SKIPPING TO NEXT ACTION CARD

Meaning: The only valid action codes are 1 (delete), 2 (add), 3 (change), and 4 (sent). All transactions are read and ignored until a valid action card is read.

Action: If the transactions were not processed correctly due to this error, correct the action card and resubmit the job.

ACVSARD 003 ERROR - INVALID SAROAD FORM NUMBER, CARD REJECTED

Meaning: The valid SAROAD form numbers are 1, 2, and 3.

Action: Correct the form number and resubmit the job.

ACVSARD 004 ERROR - NON-NUMERIC SAROAD FORM NUMBER, CARD REJECTED

Meaning: The valid SAROAD form numbers are 1, 2, and 3.

Action: Correct the form number and resubmit the job.

ACVSARD 005 ERROR - NON-NUMERIC START HOUR, CARD REJECTED

Meaning: The start hour must be numeric. The valid start hours are shown in Appendix A, Table 3.

Action: Correct the start hour and resubmit the job.

ACVSARD 006 ERROR - START HOUR INCOMPATIBLE WITH TIME CODE, CARD REJECTED

Meaning: The start hour was not valid for the time code on the transaction. See Appendix A, Table 3 for a table of valid start hour/time code combinations.

Action: Correct start hour and/or time code and resubmit the job.

ACVSARD 007 ERROR - INVALID TIME CODE, CARD REJECTED

Meaning: The time code was invalid. See Appendix A, Table 3 for valid time codes.

Action: Correct time code and resubmit the job.

ACVSARD 008 CONDITIONAL - INVALID OPTION CARD, DEFAULT (NOLIST) USED

Meaning: An invalid option was specified; therefore, the default option NOLIST was used.

Action: No action is necessary if it is acceptable to have no listing of transactions; otherwise, correct the option card and resubmit the job.

ACVSARD 009 CONDITIONAL - NO OPTION CARD, DEFAULT OPTION (NOLIST) USED

Meaning: No option card was entered; therefore, the default option NOLIST was used.

Action: No action is necessary if it is acceptable to have no listing of transactions; otherwise, include an option card and resubmit the job.

5.5.2.5 Cataloged JCL

5.5.2.5.1 JCL listing - The SAROAD to AQDHS-II conversion program, ACVSARD (AQ0010), is executed by the procedure AQCVT10, shown in Figure 5.5.2-f.

5.5.2.5.2 <u>Cross-reference of DD names and files</u>

Program Name: ACVSARD (AQ0010)

DD Names	File Description	Input/Output
AQSOPTIN	Option card	Input
AQSAROAD	SAROAD transactions	Input
AQSTRANS	AQDHS-II transactions	Output
AQSPRINT	Diagnostic report	Output

5.5.2.5.3 <u>User-supplied JCL</u> -To execute the cataloged procedure AQCVT10, the user must supply the SAROAD transactions and output JCL information for the AQDHS-II transactions. An option card can also be specified. See Figure 5.5.2-g for a description of the procedure's substitutable parameters.

5.5.2.5.4 <u>Sample run stream</u> - The following run stream from the baseline test run series reads SAROAD input transactions and an option card and outputs the AQDHS-II transactions into a data set named 'CN.EPALMH.A087.HQ.AQS.DATA.AQTRANS'.

```
//  EXEC  AQCVT10
//CONVERT.INPUT DD *
(SAROAD transactions)
/*
//CONVERT.OPTIONS DD *
NOLIST
/*
//CONVERT.OUTPUT DD UNIT=3330,VOL=SER=CDHSPK,
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(10,5),RLSE),
//             DSN=CN.EPALMH.A087.HQ.AQS.DATA.AQTRANS
```

5.5.2.6 Warnings and Special Instructions

The fields of the SAROAD and AQDHS-II transactions are similar except for the value of the time code field. See Appendix A, Table 3 for a comparison of these values. The user is cautioned to code SAROAD time code values when running ACVSARD (AQ0010) since the program converts the time code from SAROAD values to AQDHS-II values.

The number of AQDHS-II transactions produced by ACVSARD (AQ0010) may not equal the number of valid input SAROAD transactions. The reason for this is that the SAROAD transaction contains 12 readings for Form 1 data while the AQDHS-II transaction contains only eight. Thus, one day of one-hour readings (24 values) requires two SAROAD transactions and three AQDHS-II transactions. Similarly, one day of two-hour readings (12 values) needs one SAROAD transaction and two AQDHS-II transactions.

SAROAD transactions which are flagged as being in error will not be converted to AQDHS-II transactions. These erroneous transactions should be corrected and entered into another run of ACVSARD (AQ0010).

The action cards entered with the SAROAD transaction must contain a valid code ($1-delete, $2-add, $3-change, or $4-sent). The $4 action card is only used in conjunction with the $2 card and indicates that the transactions have previously been sent to SAROAD. The $4 card is in effect for all transactions following it during that execution of ACVSARD (AQ0010). If a $1, $2, or $3 card occurs after a $4 card, the transactions that follow that card will be converted and flagged as sent; however, the only transactions which are flagged as sent will be accepted by the master file transaction edit program, AEDMSTR (AQ0060), are the add transactions. The other three action code cards are in effect only until the next action card (other than $4) is read.

5.5.2.7 Cost Considerations

The following information is taken from the execution on an IBM 370/168 of the sample test run shown in Section 5.5.2.5.4 and provides an estimate of the cost of executing ACVSARD (AQ0010):

Number of SAROAD transactions:	540 transactions
Number of AQDHS-II transactions:	553 transactions
CPU time:	1.1 seconds
I/O time:	15.7 seconds
Total time:	16.8 seconds
Estimated cost:	$3.50

This test run used the NOLIST option. The cost would have been higher had the LIST option been used. To reduce computer costs, it is recommended that the NOLIST option be used. Note that NOLIST is the default option if no option is specified.

5.5.2.8 Related Programs and Procedures

After running ACVSARD (AQ0010), the cataloged procedure AQEMM10 can be run. This procedure executes AEDMSTR (AQ0060), the master file transaction edit program; ASRINTR (AQ0130), the master file internal transaction sort program; and AFMMSTR (AQ0100), the master file maintenance program. See Section 4.6.1 for more information on this procedure.

Two procedures - AQEDT10, which executes AEDMSTR (AQ0060), and AQFMM10, which executes ASRINTR (AQ0130) and AFMMSTR (AQ0100) - may be run in place of AQEMM10 if desired. AEQDT10 is discussed in Section 4.5.1.5, and AQFMM10 is discussed in Sectin 4.5.3.5.

SAROAD Transaction - Form 1 (Hourly Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Alphanumeric	State Code
4 - 7	4	Numeric	Area Code
8 - 10	3	Numeric	Site Code
11	1	Alphabetic	Agency Code
12 - 13	2	Numeric	Project Code
14	1	Numeric	Time Code
15 - 16	2	Numeric	Year
17 - 18	2	Numeric	Month
19 - 20	2	Numeric	Day
21 - 22	2	Numeric	Start Hour
23 - 27	5	Numeric	Parameter Code
28 - 29	2	Numeric	Method Code
30 - 31	2	Numeric	Units Code
32	1	Numeric	Decimal Code
33 - 36	4	Numeric	Reading
37 - 40	4	Numeric	Reading
41 - 44	4	Numeric	Reading
45 - 48	4	Numeric	Reading
49 - 52	4	Numeric	Reading
53 - 56	4	Numeric	Reading
57 - 60	4	Numeric	Reading
61 - 64	4	Numeric	Reading
65 - 68	4	Numeric	Reading
69 - 72	4	Numeric	Reading
73 - 76	4	Numeric	Reading
77 - 80	4	Numeric	Reading

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Figure 5.5.2-a. SAROAD Transaction Formats

SAROAD Transaction - Form 2 (Daily or Multiple-Parameter Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Alphanumeric	State Code
4 - 7	4	Numeric	Area Code
8 - 10	3	Numeric	Site Code
11	1	Alphabetic	Agency Code
12 - 13	2	Numeric	Project Code
14	1	Alphanumeric	Time Code
15 - 16	2	Numeric	Year
17 - 18	2	Numeric	Month
19 - 20	2	Numeric	Day
21 - 22	2	Numeric	Start Hour
23 - 27	5	Numeric	Parameter Code
28 - 29	2	Numeric	Method Code
30 - 31	2	Numeric	Units Code
32	1	Numeric	Decimal Code
33 - 36	4	Numeric	Reading
37 - 50	14		Repeat Columns 23-36
51 - 64	14		Repeat Columns 23-36
65 - 78	14		Repeat Columns 23-36
79 - 80	2		Unused

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Figure 5.5.2-a - Continued. SAROAD Transaction Formats

SAROAD Transaction - Form 2 Composite Data

Column #	Field Length	Data Type	Description
1 - 16	16		Same as Form 2 (non-composite)
17 - 18	2	Numeric	Composite Period
19 - 20	2	Numeric	Composite Number of Samples
21	1	Numeric	Composite Type
22	1	Alphanumeric	Composite Time Code
23 - 80	58		Same as Form 2 (non-composite)

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Figure 5.5.2-a - Continued. SAROAD Transaction Formats

SAROAD Transaction - Form 3
(Multiple-Station Data)

Column #	Field Length	Data Type	Description
1	1	Numeric	Form Code
2 - 3	2	Alphanumeric	State Code
4	1	Alphabetic	Agency Code
5 - 6	2	Numeric	Project Code
7	1	Alphanumeric	Time Code
8 - 12	5	Numeric	Parameter Code
13 - 14	2	Numeric	Method Code
15 - 16	2	Numeric	Units Code
17	1	Numeric	Decimal Code
18 - 19	2	Numeric	Year
20 - 21	2	Numeric	Month
22 - 23	2	Numeric	Day
24 - 25	2	Numeric	Start Hour
26 - 29	4	Numeric	Area Code
30 - 32	3	Numeric	Site Code
33 - 36	4	Numeric	Reading
37 - 49	13		Repeat Columns 24-36
50 - 62	13		Repeat Columns 24-36
63 - 75	13		Repeat Columns 24-36
76 - 80	5		Unused

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Figure 5.2.2-a - Continued. SAROAD Transaction Formats

Action Code: Indicates whether the record is to be added, changed, or deleted from the master file and appears on the action card which is input with the SAROAD transactions to ACVSARD (AQ0010).

Valid Codes: 1 - Delete
2 - Add
3 - Change
4 - Flagged as sent to SAROAD
Field Length: 1 character

Agency Code: Identifies the agency responsible for these readings.

Valid Codes: See Appendix A, Table 1. Also, the code must be in the site file.
Field Length: 1 character

Area Code: Identifies the area in which the sampling site is located.

Valid Codes: The code must be in the site file.
Field Length: 4 characters

Composite Number of Samples: Indicates the number of individual samples that were included to obtain the composite sample.

Field Length: 2 characters

Composite Period: Identifies the period during which the composite sample was taken.

Valid Codes: 01 - 04 Quarterly and Seasonal Composite
01 - 12 Monthly Composite
01 - 52 Weekly Composite
00 Annual Composite

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Figure 5.5.2-b. Description of SAROAD Transaction Fields

Field Length: 2 characters

Composite Time Code: Indicates the interval at which the individual composite sample was taken.
Valid Codes: The SAROAD time codes should be used. See Appendix A, Table 3 for the proper codes.
Field Length: 1 character

Composite Type: Indicates the interval of the composite sample.
Valid Codes: 1 - Quarterly Composite
2 - Seasonal Composite
3 - Monthly Composite
4 - Weekly Composite
5 - Annual Composite
Field Length: 1 character

Day: The day of the month on which the sample was taken.
Field Length: 2 characters

Decimal Code: Indicates the number of digits in the reading to the right of the decimal point.
Valid Codes: 0-4
Field Length: 1 character

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Figure 5.5.2-b - Continued. Description of SAROAD Transaction Fields

Form Code: Indicates which transaction format is being used.
Valid Codes: 1 - Form 1
2 - Form 2
3 - Form 3
Field Length: 1 character

Method Code: Identifies both the collection method and the analysis method for the parameter being measured.
Valid Codes: The code must be in the parameter file.
Field Length: 2 characters

Month: The month of the year during which the sample was taken.
Field Length: 2 characters

Parameter Code: Identifies the parameter being measured.
Valid Codes: Refer to AEROS Manual Series, Volume V: AEROS Manual of Codes for a full list of currently accepted parameter codes. Also, the code must be in the parameter file.
Field Length: 5 characters

Project Code: Identifies the project associated with the sample.
Valid Codes: See Appendix A, Table 2. Also, the code must be in the site file.
Field Length: 2 characters

Reading: The value of the sample taken.
Valid Codes: This field can contain either positive or negative data; however, either type must be right-justified within the

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Figure 5.5.2-b - Continued. Description of SAROAD Transaction Fields

field. Also, if the reading is negative, it must adhere to the following format: -ddd where d is any digit 0-9. See Appendix A, Table 5 for a list of parameters which may have negative readings.

Field Length: 4 characters

Site Code: Identifies the site at which the sample was taken.

Valid Codes: The code must be in the site file.

Field Length: 3 characters

Start Hour: On Form 1 transactions, the hour at which the first reading was taken. On Form 2 and Form 3 transactions, the hour at which the sample was taken.

Valid Codes: See Appendix A, Table 3.

Field Length: 2 characters

State: Indicates the state in which the sampling site is located.

Valid Codes: The code must be in the site file.

Field Length: 2 characters

Time Code: Indicates the interval at which the samples were taken.

Valid Codes: See Appendix A, Table 3. The SAROAD time code should be used since SAROAD time codes are converted to AQDHS-II time codes by ACVSARD (AQ0010).

Field Length: 1 character

Units Code: Indicates the units in which the parameter was measured.

Valid Codes: See Appendix A, Table 4 for a partial list. Also, the code must be in the parameter file.

Field Length: 2 characters

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Figure 5.5.2-b - Continued. Description of SAROAD Transaction Fields

Year: The year in which the sample was taken.

Valid Codes: The year must be greater than or equal to 60.

Field Length: 2 characters

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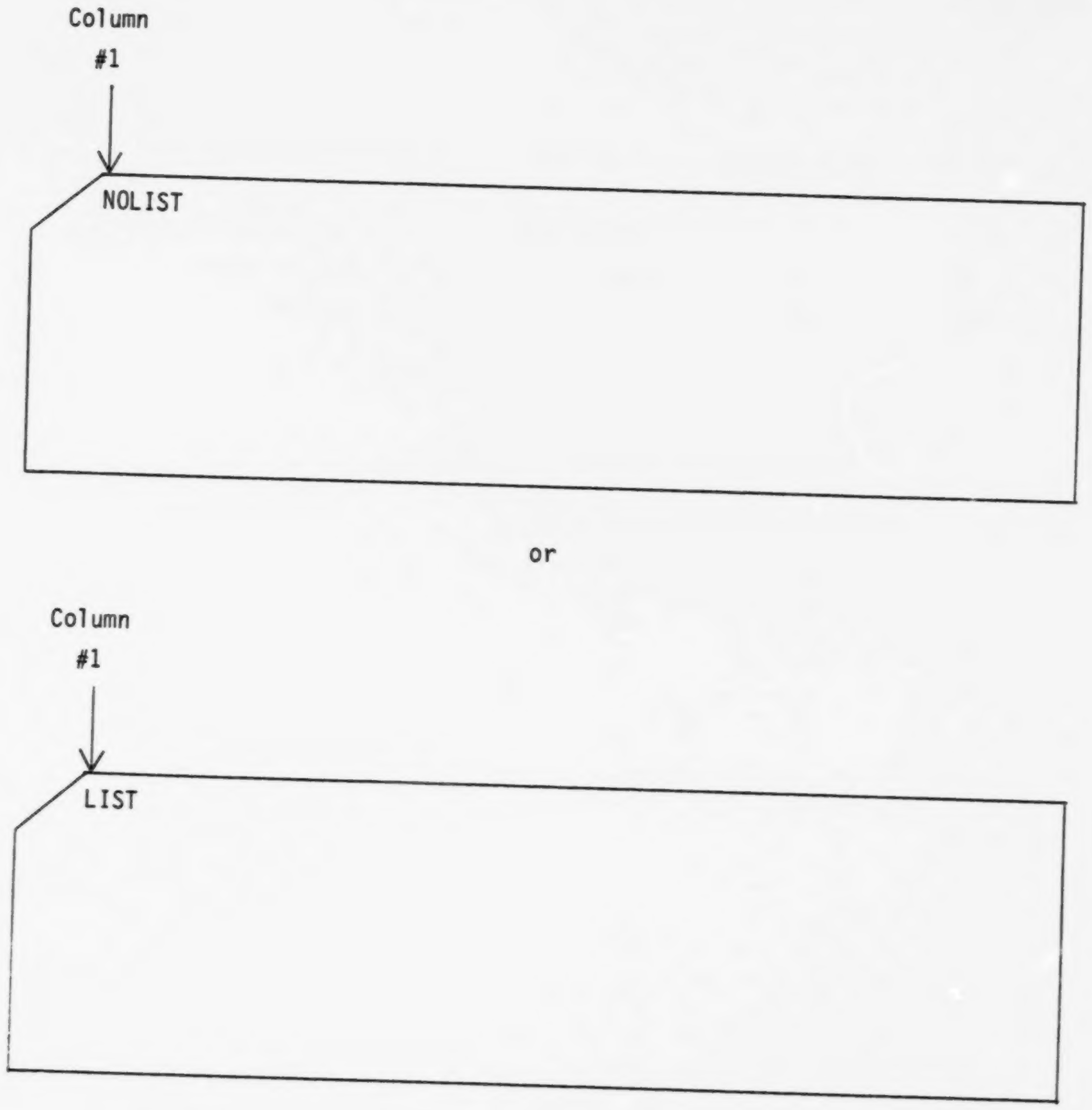
Figure 5.5.2-b - Continued. Description of SAROAD Transaction Fields

Column #	Field Length	Data Type	Description
1	1	Alphanumeric	Identifier - value $
2	1	Numeric	Action code
3 - 80	78		Unused

Figure 5.5.2-c. Action Card Format



The specified option must be punched beginning in column #1 with no spaces between the letters.

Figure 5.5.2-d. Option Card Format

```
                              SAROAD TO AQDHS-II CONVERSION PROGRAM  -  DIAGNOSTIC REPORT                    PAGE    1
 PROGRAM NAME: ACVSARD (AQ0010)
 REVISION LEVEL: 1-00
 LAST UPDATE #: 24
 DATE INCORPORATED: OCTOBER 31, 1978


OPTION IN EFFECT: NOLIST

7373000997A0527707010043101110720001
*** ACVSARD 003 ERROR - INVALID SAROAD FORM NUMBER, CARD REJECTED

 373000997A0527707010043101110720001
*** ACVSARD 004 ERROR - NON-NUMERIC SAROAD FORM NUMBER, CARD REJECTED

1373000997A05D7707010043101110720001
*** ACVSARD 007 ERROR - INVALID TIME CODE, CARD REJECTED

1373000997A052770701 043101110720001
*** ACVSARD 005 ERROR - NON-NUMERIC START HOUR, CARD REJECTED

NUMBER OF INPUT SAROAD TRANSACTIONS:          657
NUMBER OF SACTION CARDS:                        1
NUMBER OF AQDHS-II TRANSACTIONS WRITTEN:      970
NUMBER OF DIAGNOSTIC MESSAGES:                  4
```

Figure 5.5.2-e. Diagnostic Report

```
//*
//*   PROCEDURE NAME: AQCVT10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO CONVERT SAROAD FORMAT
//*   TRANSACTIONS TO AQDHS-II FORMAT TRANSACTIONS
//*
//*
//AQCVT10 PROC PROJECT='CN.EPALMH.A08[illegible]-CDHS.HQ.AQS',
//             PROGRAM=ACVSARD,
//             OUT=A
//*
//CONVERT EXEC PGM=&PROGRAM,
//             REGION=60K,
//             TIME=(3,0)
//*
//* CONVERT SAROAD INPUT FORMAT TO AQDHS INPUT FORMAT
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - EDIT OPTIONS CONTROL CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - SAROAD TRANSACTIONS
//*
//AQSAROAD  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - AQDHS-II TRANSACTIONS
//*
//AQSTRANS  DD DDNAME=OUTPUT
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

Figure 5.5.2-f. Cataloged Procedure AQCVT10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FTMSTRAA would be the full data set name of the AQDHS-II master file)
PROGRAM	ACVSARD	SAROAD to AQDHS-II conversion program
OUT	A	SYSOUT class for all print files

Figure 5.5.2-g. Substitutable Parameters for AQCVT10

5.5.3 MASTER FILE COBOL TO FORTRAN FORMAT CONVERSION PROGRAM - ACVMFOR (AQ0020)

5.5.3.1 Description

ACVMFOR (AQ0020) is a file format conversion program. It is intended for the user who has ANS FORTRAN programs which use data from the AQDHS-II master file. Prior to executing user-written FORTRAN programs, the user can execute ACVMFOR (AQ0020) to generate a FORTRAN-compatible file containing the data from the AQDHS-II master file. ACVMFOR (AQ0020) can also be used to convert any AQDHS-II answer file to FORTRAN-compatible format.

As expected, the FORTRAN-compatible master file contains more physical records than the input master file. It has a header record as well as a trailer record; moreover, each record from the AQDHS-II master file is split into one to four output records. This splitting is required because an AQDHS-II master file consists of variable-length records which store up to a maximum of 31 readings whereas the FORTRAN-compatible master file consists of fixed-length records which store ten readings. All readings from an AQDHS-II master file record are stored in a set of FORTRAN-compatible records which have the same key fields and are sequenced by the record sequence field. Each set starts with a record sequenced by 'A', followed by 'B', and so on. Two different AQDHS-II master file records generate two different sets of FORTRAN-compatible records.

5.5.3.2 File Formats

Input to ACVMFOR (AQ0020) consists of an AQDHS-II master file or answer file (refer to Figure 4.5.3-a).

Output consists of a FORTRAN-compatible master file whose format is shown in Figure 5.5.3-a. A diagnostic report which has the standard update messages and summary statistics is also produced. See Figure 5.5.3-b for a sample of the diagnostic report.

5.5.3.3 Options

There are no options.

5.5.3.4 Error Messages

ACVMFOR 001 ERROR - NO INPUT RECORDS - OUTPUT UNUSABLE

Meaning: There are no records in the specified input master file; thus, the output file consists only of a header record and a trailer record.

Action: Specify a valid master file and resubmit.

5.5.3.5 Cataloged JCL

5.5.3.5.1 JCL listing - ACVMFOR (AQ0020) can be run by executing the cataloged procedure AQCVM10. See Figure 5.5.3-c for a listing of this procedure.

5.5.3.5.2 Cross-reference of DD names and files

Program Name: ACVMFOR (AQ0020)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file or answer file	Input
AQSMFORT	FORTRAN-compatible master file	Output
AQSPRINT	Diagnostic report	Output

5.5.3.5.3 User-supplied JCL - To execute the cataloged procedure AQCVM10, the user can expect to supply job accounting information and the data set names of the input AQDHS-II master file and the output FORTRAN-compatile master file. See Figure 5.5.3-d for a description of the procedure's substitutable parameters.

5.5.3.5.4 Sample run stream - The following run stream would produce a FORTRAN-compatible master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FORTMSTR' from the input AQDHS-II master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQSFILE'.

```
//  EXEC  AQCVM10
//        MSTRFIL=AQSFILE,
//        MSTRFOR=FORTMSTR
```

5.5.3.6 Warnings and Special Instructions

There are no warnings and special instructions.

5.5.3.7 Cost Considerations

The following estimates are for the execution of ACVMFOR (AQ0020) on an IBM 370/168:

Size of AQDHS-II master file:	20 records
Size of FORTRAN-compatible master file:	64 records
CPU time:	.2 second
I/O time:	6.4 seconds
Total time:	6.6 seconds
Estimated cost:	$1.04

5.5.3.8 Related Programs and Procedures

Since an AQDHS-II master file is not readable to an ANS FORTRAN program, ACVMFOR (AQ0020) is designed to convert the AQDHS-II master file to a FORTRAN-compatible format. Any user-written FORTRAN program that accesses the master file can be designed to utilize the FORTRAN-compatible master file produced by ACVMFOR (ACV0020). ACVMFOR (ACV0020) would be executed prior to the execution of any such user-designed FORTRAN program.

Currently, there are no AQDHS-II programs or procedures to use the file created by ACVMFOR (AQ0020). This program provides the user a means of accessing his file with his own FORTRAN program.

Record Position	Field Length	Description	
1	1	Record Sequence	
2	1	Action Code	
3	1	Form Code	
4	1	Record Status Flag	
5 - 8	4	Reserved Area	
9 - 10	2	State Code	
11 - 13	3	AQCR	
14 - 17	4	County Code	
18 - 21	4	Area Code	
22 - 24	3	Site Code	
25	1	Agency Code	
26 - 27	2	Project Code	
28	1	Time Code	
29 - 30	2	Year	
31 - 35	5	Parameter Code	
36 - 37	2	Method Code	
38 - 39	2	Unit Code	
40 - 41	2	Month Code	
42 - 43	2	Day Code	
44 - 45	2	Start Hour	
46	1	SLAMS/NAMS ID	
47 - 56	10	Reserved Area	
57 - 58	2	Number of Readings	
59	1	Status Flag	
60	1	Decimal Code	Occurs 1 to 10 times
61 - 64	4	Reading	

Figure 5.5.3-a. FORTRAN-compatible Record Format

```
                    AQDHS-II MASTER FILE COBOL TO FORTRAN CONVERSION PROGRAM  -  DIAGNOSTIC REPORT           PAGE     1


 PROGRAM NAME: ACVMFOR (AQ0020)
 REVISION LEVEL: 1-00
 LAST UPDATE #: 24
 DATE INCORPORATED: OCTOBER 31, 1978

NUMBER OF FILE RECORDS READ:        331
NUMBER OF FILE RECORDS WRITTEN:     707
NUMBER OF ERRORS DETECTED:            0
```

Figure 5.5.3-b. Diagnostic Report

```
//*
//*    PROCEDURE NAME: AQCVM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED : OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO CREATE A FORTRAN-COMPATIBLE
//*    FILE OF AQDHS-II MASTER FILE RECORDS FOR INPUT TO USER-WRITTEN
//*    FORTRAN PROGRAMS
//*
//*
//AQCVM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ACVMFOR,
//             TIME1='1,0',
//             MSTRFIL=AQMASTER,
//             MSTRFOR=AQFORMST,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,PASS,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             OUT=A
//*
//CONVERT  EXEC PGM=&PROGRAM,
//             TIME=(&TIME1)
//*
//* PRODUCE A FORTRAN-COMPATIBLE FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - AQDHS MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - FORTRAN-COMPATIBLE STATISTICS FILE
//*
//AQSMFORT  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&MSTRFOR
//*
//* OUTPUT DATA SET - MESSAGE LISTING
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
```

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Figure 5.5.3-c. Cataloged Procedure AQCVM10

```
//*                                                                     00005900
//SYSDBOUT  DD SYSOUT=&OUT                                              00006000
//*                                                                     00006100
//SYSDTERM  DD SYSOUT=&OUT                                              00006200
//*                                                                     00006300
//SYSUDUMP  DD SYSOUT=&OUT                                              00006400
//*                                                                     00006500
```

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Figure 5.5.3-c - continued. Cataloged Procedure AQCVM10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names
PROGRAM	ACVMFOR	Master file COBOL to FORTRAN format conversion program
TIME1	'1,0'	Time allocated for execution of ACVMFOR
MSTRFIL	AQMASTER	Lowest-level index of master file
MSTRFOR	AQFORMST	Lowest-level index of FORTRAN-compatible file
UNIT	3330	Unit type to which output FORTRAN-compatible file is to be written
SERIAL	CDHSPK	Volume ID to which output FORTRAN-compatible file is to be written
DISP	'NEW,PASS,DELETE'	Disposition of output FORTRAN-compatible file
SPCUNIT	TRK	Units in which space for output FORTRAN-compatible file is to be allocated
PRIMARY	20	Primary space allocation for output FORTRAN-compatible file
SECNDRY	10	Secondary space allocation for output FORTRAN-compatible file
OUT	A	SYSOUT class for all print files

Figure 5.5.3-d. Substitutable Parameters for AQCVM10

5.5.4 PARAMETER FILE COBOL TO FORTRAN FORMAT CONVERSION PROGRAM - ACVPFOR (AQ0030)

5.5.4.1 Description

ACVPFOR (AQ0030) converts the AQDHS-II parameter file to a FORTRAN-compatible file that can be used as input to FORTRAN programs; it is intended for the user who has ANS FORTRAN programs which use data from the AQDHS-II parameter file. Prior to executing his FORTRAN programs, the user can execute ACVPFOR (AQ0030) to convert the parameter file to a FORTRAN-compatible format.

The data fields in a converted record are the same as in the input file with the exception of the 'minimum detectable' data field. The minimum detectable is represented in the COBOL parameter file as a signed four-digit number; the decimal position for this number is indicated in a separate field. When the file is converted to the FORTRAN-compatible format, the minimum detectable is represented by a ten-character field containing the sign ('-' if negative, blank if positive), the decimal point, and the actual numerical value.

Additionally, a header record containing zeroes and a trailer record containing nines are appended to the converted file. The header record of zeros signifies that this file is FORTRAN-compatible and should not be used in maintenance activities, and the trailer record provides an end of file for those computer systems which do not recognize COBOL end-of-files.

5.5.4.2 File Formats

The input to ACVPFOR (AQ0030) is the AQDHS-II parameter file. See Figure 4.2.2-c for a description of the parameter file format.

Output consists of a FORTRAN-compatible parameter file and a diagnostic report containing an input count, an output count, and an error count. See Figure 5.5.4-a for a description of the converted parameter file format and Figure 5.5.4-b for an example of the diagnostic report.

5.5.4.3 Options

There are no options.

5.5.4.4. Error Messages

*** ACVPFOR 001 ERROR - NO INPUT RECORDS, OUTPUT UNUSABLE

Meaning: The input AQDHS-II parameter file contains no records; therefore, the output file contains only a header record and a trailer record.

Action: Check the input AQDHS-II parameter file to insure that it is the proper file. Correct the error and resubmit the job.

5.5.4.5 Cataloged JCL

5.5.4.5.1. JCL Listing - ACVPFOR (AQ0030) can be run by executing the cataloged procedure AQCVP10. See Figure 5.5.4-c for a listing of this procedure.

5.5.4.5.2 Cross-reference of DD names and files

Program Name: ACVPFOR (AQ0030)

DD Name	File Description	Input/Output
AQSPARMK	AQDHS-II parameter file	Input
AQSPARMF	Converted parameter file	Output
AQSPRINT	Diagnostic report	Output

5.5.4.5.3 User-supplied JCL - The user must supply the data set names of the input AQDHS-II parameter file and the output converted parameter file. See Figure 5.5.4-d for a description of the procedure's substitutable parameters.

5.5.4.5.4 Sample run stream - The following run stream would produce the FORTRAN-compatible parameter file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FPARMFIL' from the AQDHS-II parameter file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.CPARMFIL':

```
//  EXEC  AQCVP10,
//        PARMFIL=CPARMFIL,
//        PARMFFL=FPARMFIL
```

5.5.4.6 Warnings and Special Instructions

To insure that a usable output file is created, the user must input a valid AQDHS-II parameter file to ACVPFOR (AQ0030).

5.5.4.7 Cost Considerations

A test run of ACVPFOR (AQ0030) was executed on an IBM 370/168 using a test AQDHS-II parameter file. The following estimates are for that test run:

AQDHS-II parameter file:	44 records
Converted parameter file:	46 records
CPU time:	0.1 second
I/O time:	3.2 seconds
Total time:	3.3 seconds
Estimated cost:	$0.93

5.5.4.8 Related Programs and Procedures

An AQDHS-II parameter file cannot be read by an ANS FORTRAN program. ACVPFOR (AQ0030) is designed to convert the AQDHS-II parameter file to a FORTRAN-compatible format. Any user-written FORTRAN program that accesses the parameter file can be designed to utilize the FORTRAN-compatible parameter file produced by ACVPFOR (AQ0030). ACVPFOR (AQ0030) would be executed prior to the execution of any such user-designed FORTRAN program.

Record Field	Description	Type
1 - 5	Parameter Code	Numeric
6 - 7	Method Code	Numeric
8 - 9	Unit Code	Numeric
10 - 19	Minimum Detectable	Numeric (signed)
20	Decimal Position	Numeric

Figure 5.5.4-a. Format of the Converted Parameter File

```
                AQDHS-II PARAMETER FILE COBOL TO FORTRAN CONVERSION PROGRAM  -  DIAGNOSTIC REPORT          PAGE     1

   PROGRAM NAME: ACVPFOR (AQ0030)
   REVISION LEVEL: 1-00
   LAST UPDATE #: 24
   DATE INCORPORATED: OCTOBER 31, 1978

  NUMBER OF FILE RECORDS READ:          111
  NUMBER OF FILE RECORDS WRITTEN:       113
  NUMBER OF ERRORS DETECTED:              0
```

Figure 5.5.4-b. Diagnostic Report

```
//*
//*   PROCEDURE NAME: AQCVP10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO CREATE A FORTRAN-COMPATIBLE FILE
//*   OF AQDHS-II PARAMETER FILE INFORMATION FOR INPUT TO USER-WRITTEN
//*   FORTRAN PROGRAMS
//*
//*
//AQCVP10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ACVPFOR,
//             PARMFIL=AQPARMFL,
//             PARMFOR=AQFORPRM,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,PASS,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=10,
//             SECNDRY=5,
//             OUT=A
//*
//SENTINEL EXEC PGM=&PROGRAM,
//             REGION=60K,
//             TIME=(1,0)
//*
//* CONVERT PARAMETER FILE TO FORTRAN-COMPATIBLE FORMAT
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - PARAMETER FILE
//*
//AQSPARMK  DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - FORTRAN-COMPATIBLE PARAMTER FILE
//*
//AQSPARMF  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&PARMFOR
//*
//* OUTPUT DATA SET - MESSAGE LISTING
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDROUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

Figure 5.5.4.c. Cataloged Procedure AQCVP10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., the full data set name of the AQDHS-II parameter file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.HTPARMAA')
PROGRAM	ACVPFOR	Parameter file COBOL to FORTRAN format conversion program
PARMFIL	AQPARMFL	Lowest-level index of AQDHS-II parameter file
PARMFFL	AQFORPRM	Lowest-level index of converted parameter file
UNIT	3330	Unit type to which the converted parameter file will be written
SERIAL	CDHSPK	Volume ID to which the converted parameter file will be written
DISP	'NEW,PASS,DELETE'	Disposition of the converted parameter file
SPCUNIT	TRK	Units in which space for the converted parameter file is to be allocated
PRIMARY	10	Primary space allocation for the converted parameter file
SECONDRY	5	Secondary space allocation for the converted parameter file
OUT	A	SYSOUT class for all print files

Figure 5.5.4-d. Substitutable Parameters for AQCVP10

5.5.5 ANOMALY SCREENING MASTER FILE CONVERSION PROGRAM - ACVANOM (AQ0040)

5.5.5.1 Description

ACVANOM (AQ0040) is the first of two programs used to screen the AQDHS-II master file for readings that are anomalous and, therefore, potentially in error. The anomaly screening report program, ARPANOM (AQ0320), must be executed after ACVANOM (AQ0040) to complete the anomaly screening process.

Anomaly screening of the AQDHS-II master file is accomplished by subjecting the readings in the file to various anomaly screening tests. Presently, only non-null readings that fall into one of the categories listed in Figure 5.5.5-a are screened for anomalies.

All non-null hourly readings which fall into one of the categories in Figure 5.5.5-a are subjected to the gap test by ACVANOM (AQ0040). All other anomaly screening tests are performed by ARPANOM (AQ0320). The gap test is discussed below.

The gap test is a probabilistic approach to evaluating any gaps in the frequency distribution of hourly data readings; it is performed on hourly readings for an entire month. Before performing the gap test, readings for ozone, total oxidants, sulfur dioxide, and nitrogen dioxide are converted to parts per hundred million and readings for carbon monoxide are converted to parts per million. The resulting values are truncated to integer values. A gap of length k in these integer values is defined as k consecutive integers not assumed by any of the values.

The probability of each gap is computed and the data is judged to contain one or more anomalous readings if the probability of any gap is less than 0.01. The probability of a gap of length k with n data points above the gap is $e^{-n\lambda k}$.

This expression for the probability was derived assuming the exponential frequency distribution as the underlying frequency distribution for the readings. In the expression $e^{-n\lambda k}$, λ is a constant assuming one of two values; i.e., the gap test is performed twice, using two separate values of λ. To test for internal consistency of the data,

$$\lambda = \frac{\ln (.5/.05)}{x - y}$$

where x = the calculated 95th percentile of the data being tested
y = the calculated 50th percentile of the data being tested.

To test for consistency with expected values,

$$\lambda = \frac{\ln (.5/.001)}{x - y}$$

where x = a value that the data should not exceed more than one time in a thousand (i.e., an assumed 99.9th percentile). The values used are 75 parts per million for carbon monoxide, 100 parts per hundred million for sulfur dioxide, 60 parts per hundred million for nitrogen dioxide and 50 parts per hundred million for ozone and total oxidants. These values were provided by the Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Environmental Protection Agency.
y = the calculated 50th percentile of the data being tested.

When using the first λ value, the gap test should identify readings that differ grossly from other readings in the month. When using the second λ value, the gap test should identify months of readings that, as a whole, differ grossly from expected values (for example, months in which all decimal point indicators are incorrect).

5.5.5.2 File Formats

ACVANOM (AQ0040) uses three input files: the AQDHS-II master file, the AQDHS-II parameter file, and an option card. See Figure 4.5.3-a for the master file format, Figure 4.2.2-c for the parameter file format and Section 5.5.5.3 for a discussion of the option card.

There are three output files produced by ACVANOM (AQ0040): a new AQDHS-II master file, a temporary file of readings to be screened, and a diagnostic report.

The output master file differs from the input master file only in the values of the status flags for the records and individual readings. Figure 5.5.5-b details the status flags for records and Figure 5.5.5-c details the status flags for readings. It should be noted that only non-null readings which fall into one of the categories listed in Figure 5.5.5-a are subjected to the anomaly screening tests. Any reading that is null (9999 or 9998) or does not fall into one of those categories will never be screened or be flagged as having undergone anomaly screening. Additionally, three previous months of daily readings are needed as a basis for screening a given month of daily data. Thus the first three months of daily readings for a given site key and parameter key will not be flagged on the new master file as having undergone anomaly screening.

The status flags enable the anomaly screening programs, ACVANOM (AQ0040) and ARFANOM (AQ0320), to perform the anomaly screening tests only on data that has not been previously screened. Tests that involve more than one reading (for example, the gap test which is based on a month of hourly readings) will be performed if any reading in the appropriate group of data has not undergone anomaly screening. Data that undergoes anomaly screening will not be subjected to the anomaly screening tests during subsequent executions of ACVANOM (AQ0040) and ARPANOM (AQ0320). The record status flag increases efficiency since ACVANOM (AQ0040) can bypass or process a master file record based upon the value of the record status flag. ACVANOM (AQ0040) is one of three AQDHS-II programs that affect the status flags, the other two being the AQDHS-II master file maintenance program, AFMMSTR (AQ0100), and the AQDHS-II to SAROAD conversion program, ARPSARD (AQ0220).

The temporary file produced by ACVANOM (AQ0040) is passed to ARPANOM (AQ0320). Since ARPANOM (AQ0320) is coded in FORTRAN, this file is FORTRAN-compatible. It consists of fixed-length records of 115 characters and contains readings from the master file which satisfy the following criteria: (1) they fall into one of the categories listed in Figure 5.5.5-a; (2) they are contained in master file records having one or more non-null readings that have not been previously screened; (3) for daily readings, there are at least three previous months of readings with the same site and parameter keys; and (4) they are contained in master file records having one or more non-null readings that exceed the nominal values listed in Figure 5.5.5-d. (When the FLAG LOW option is specified, the last criterion is waived for daily readings.) The readings in this temporary file are expressed in both their original format and (for non-null readings) in the standard units specified on the parameter file. The file also contains certain statistics (see Section 6.4.3.1, Shewhart Test) used by ARPANOM (AQ0320) in screening daily readings, as well as record-key information for each month of hourly readings which fails the gap test.

The diagnostic report consists of update messages, program statistics, and error messages. It also lists the option in effect. See Figure 5.5.5-e for a sample printout and Section 5.5.5.4 for a listing of the error messages.

5.5.5.3 Options

ACVANOM (AQ0040) has two options - FLAG LOW and NO FLAG LOW. These options control the selection of daily data to be included in the temporary file produced by ACVANOM (AQ0040). When the NO FLAG LOW option is in effect, daily data must satisfy only the four criteria listed in Section 5.5.5.2; when the FLAG LOW option is in effect, daily data must satisfy only the first three criteria. Furthermore, when the NO FLAG LOW option is in effect, the Shewhart test performed by ARPANOM (AQ0320) can identify only unusually high daily data, whereas unusually high or low daily data can be identified when the FLAG LOW option is in effect.

The FLAG LOW option is specified by entering FLAG LOW on the option card; NO FLAG LOW is specified by entering NO FLAG LOW. See Figure 5.5.5-f for the format of the option card. NO FLAG LOW is the default option whenever no option card or a blank option card is entered.

5.5.5.4 Error Messages

ACVANOM 001 CONDITIONAL - NO INPUT RECORDS
Meaning: The input master file contains no records.
Action: Verify that the correct file was input.

ACVANOM 002 ABORT - PARAMETER TABLE OVERFLOW
Meaning: The number of parameter file records in the parameter file for pollutants that fall into the categories in Figure 5.5.5-a is greater than the maximum allowed.
Action: See Appendix C for instructions on increasing the allowed size.

ACVANOM 003 ABORT - NUMBER OF PARAMETER CODE RECORDS EXCEEDS MAXIMUM ALLOWED
Meaning: ACVANOM (AQ0040) attempted to enter more parameter file records than the parameter table can hold.
Action: See Appendix C for instructions on increasing the allowed size of the parameter file.

ACVANOM 004 ABORT - NO MATCH FOUND ON PARAMETER FILE FOR ZZZZZZZZZ

Meaning: A record was found in the master file containing parameter-method-unit key ZZZZZZZZZ, but no record was found in the parameter file for this parameter-method-unit key.

Action: Verify that the correct input files were used. If the master file is in error, correct using programs AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). If the parameter file is in error, correct using programs ASRPARM (AQ0150) and AEMPARM (AQ0070). After appropriate corrections have been made, re-execute ACVANOM (AQ0040).

ACVANOM 005 ABORT - INVALID OPTION SPECIFIED

Meaning: The option on the option card is invalid.

Action: Correct or delete the option card. Re-execute ACVANOM (AQ0040).

ACVANOM 006 CONDITIONAL - STD UNITS CONV FAC OF ZERO ENCOUNTERED, SCREENING NOT PERFORMED (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ)

Meaning: A zero standard units conversion factor was found in the parameter file for parameter-method-unit key ZZZZZZZZZ; the master file record containing readings for this parameter-method-unit key was bypassed. (XXXXXXXXXXXXX is the state-area-site-agency-project-time codes and YYYYYY is the year-month-day of the bypassed master file record.)

Action: Modify the parameter file using programs ASRPARM (AQ0150) and AEMPARM (AQ0070) to enter a non-zero standard units conversion factor for parameter-method-unit key ZZZZZZZZZ. Re-execute ACVANOM (AQ0040).

ACVANOM 007 CONDITIONAL - READING(S) > 9999.9999 IN STD UNITS, SCREENING NOT PERFORMED (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ)

Meaning: One or more readings in the master file record exceed 9999.9999 when converted to standard units (XXXXXXXXXXXXX is the state-area-site-agency-project-time codes, YYYYYY is the year-month-day and ZZZZZZZZZ is the parameter-method-unit key). This record is bypassed.

Action: Examine the readings in this record to insure that all are correct. Any readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100).

5.5.5.5 Cataloged JCL

ARPANOM (AQ0320) should always be executed in conjunction with ACVANOM (AQ0040). See Section 6.4.3.5 for a discussion of the cataloged procedure AQRPM45, which executes both programs.

5.5.5.6 Warnings and Special Instructions

To screen the AQDHS-II master file, both ACVANOM (AQ0040) and ARPANOM (AQ0320) must be executed successfully.

All readings subjected to anomaly screening tests are converted to standard units by using the appropriate standard units conversion factor from the AQDHS-II parameter file. Thus it is imperative that the standard units conversion factors on the parameter file are correct. Execution of ARPPARM (AQ0240) will permit verification of entries in the parameter file.

Records causing error 'ACVANOM 006' or 'ACVANOM 007' are not subjected to, nor included in, any anomaly screening tests.

Any readings identified in the reports from ARPANOM (AQ0320) as being anomalous should be verified. Any readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). The skeleton transactions created by ARPANOM (AQ0320) may be used to create the necessary master file transactions. The user is cautioned to save all printed anomaly screening reports until all anomalous data has been checked and verified or changed. If anomalous data has been verified, it is recommended that this verification be forwarded to the user's Regional Office when this data is submitted to SAROAD.

When ACVANOM (AQ0040) is executed, the reading and record status flags in the master file are appropriately changed to indicate which readings have been screened. Data that has been screened will not be subjected to anomaly screening again. However, if a screened reading is subsequently changed using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100) then both the reading status flag and the record status flag are reset and the changed reading is screened during the next execution of ACVANOM (AQ0040) and ARPANOM (AQ0320).

No reading in the master file is changed or deleted by the anomaly screening programs. The user bears the sole responsibility of changing any values found to be in error.

The anomaly screening tests are applied only to non-null readings which fall into one of the categories listed in Figure 5.5.5-a. Other readings are not subjected to anomaly screening tests. Furthermore, the anomaly screening programs cannot be expected to identify all erroneous readings among those categories since a reading can be in error without being judged anomalous. Thus, one cannot assume that readings that pass the anomaly screening tests are valid. The anomaly screening programs are only tools to improve the quality of data in the AQDHS-II master file.

The FLAG LOW option is not recommended for ordinary use for two reasons. First, the major concern in air quality data is valid high readings which exceed the standards. The FLAG LOW option identifies readings that are classified anomalous even though they may be considerably below the standards. Secondly, the FLAG LOW option may identify a large quantity of readings as being anomalous.

There is no distinction between low and high Shewhart test failures in the anamoly screening report for daily data.

5.5.5.7 Cost Considerations

The following estimates are for the execution of ACVANOM (AQ0040) on an IBM 370/168:

Size of AQDHS-II master file:	8479 records	
Size of output file written to ARPANOM (AQ0320):	978 records	
CPU time:	1 minute	35.5 seconds
I/O time:		25.7 seconds
Total time:	2 minutes	1.2 seconds
Estimated cost:	$18.36	

5.5.5.8 Related Programs and Procedures

ACVANOM (AQ0040) should always be executed in conjunction with ARPANOM (AQ0320). The cataloged procedure AQRPM45 will execute both programs.

Pollutant	Sampling Interval	Parameter Code	AQDHS-II Time Code
Total Suspended Particulate	Daily	11101	8
Carbon Monoxide	Hourly	42101	1
Sulfur Dioxide	Hourly	42401	1
Sulfur Dioxide	Daily	42401	8
Nitrogen Dioxide	Hourly	42602	1
Nitrogen Dioxide	Daily	42602	8
Total Oxidants	Hourly	44101	1
Ozone	Hourly	44201	1

Figure 5.5.5-a. Categories of Data Subjected to Anomaly Screening Tests

	Record Status Flags	
	One or more non-null readings in the record have not undergone anomaly screening	All non-null readings in the record have undergone anomaly screening
All readings in the record have been submitted to SAROAD and one or more readings are non-null	S	T
One or more readings in the record have not been submitted to SAROAD and one or more readings are non-null	N	V
All readings are null	X	X

Figure 5.5.5-b. Status Flags for Records, AQDHS-II Master File

	Reading Status Flags	
	Reading has not undergone anomaly screening	Reading has undergone anomaly screening
Reading has been added, not submitted to SAROAD	A	B
Reading has been changed, not submitted to SAROAD	C	D
Reading has been submitted to SAROAD	S	T

Figure 5.5.5-c. Status Flags for Readings, AQDHS-II Master File

Pollutant	Parameter Code	Sampling Interval	Value
Total Suspended Particulate	11101	Daily	260 $\mu g/m^3$
Carbon Monoxide	42101	Hourly	20 mg/m^3
Sulfur Dioxide	42401	Hourly	650 $\mu g/m^3$
Sulfur Dioxide	42401	Daily	365 $\mu g/m^3$
Nitrogen Dioxide	42602	Hourly	225 $\mu g/m^3$
Nitrogen Dioxide	42602	Daily	100 $\mu g/m^3$
Total Oxidants	44101	Hourly	100 $\mu g/m^3$
Ozone	44201	Hourly	100 $\mu g/m^3$

Figure 5.5.5-d. Nominal Values for Categories of Data to be Screened for Anomalies

```
                    AQDHS-II ANOMALY SCREENING MASTER FILE CONVERSION PROGRAM  -  DIAGNOSTIC REPORT                    PAGE    1

  PROGRAM NAME: ACVANOM (AQ0040)
  REVISION LEVEL: 1-00
  LAST UPDATE #: 24
  INCORPORATED: OCTOBER 31, 1978

  OPTION IN EFFECT: LOW SHEWHART TEST


*** ACVANOM 007 CONDITIONAL - READING(S) >  9999.9999 IN STD UNITS, SCREENING NOT PERFORMED (340002001D051-760303-424011407)

  NUMBER OF MASTER FILE RECORDS READ:                                     341
  NUMBER OF MASTER FILE RECORDS WRITTEN:                                  341
  NUMBER OF MASTER FILE RECORDS CONTAINING DATA TO BE SCREENED:            62
  NUMBER OF RECORDS PASSED TO PROGRAM ARPANOM:                            146
  NUMBER OF ABORT MESSAGES:                                                 0
  NUMBER OF CONDITIONAL MESSAGES:                                           1
```

Figure 5.5.5-e. Diagnostic Report

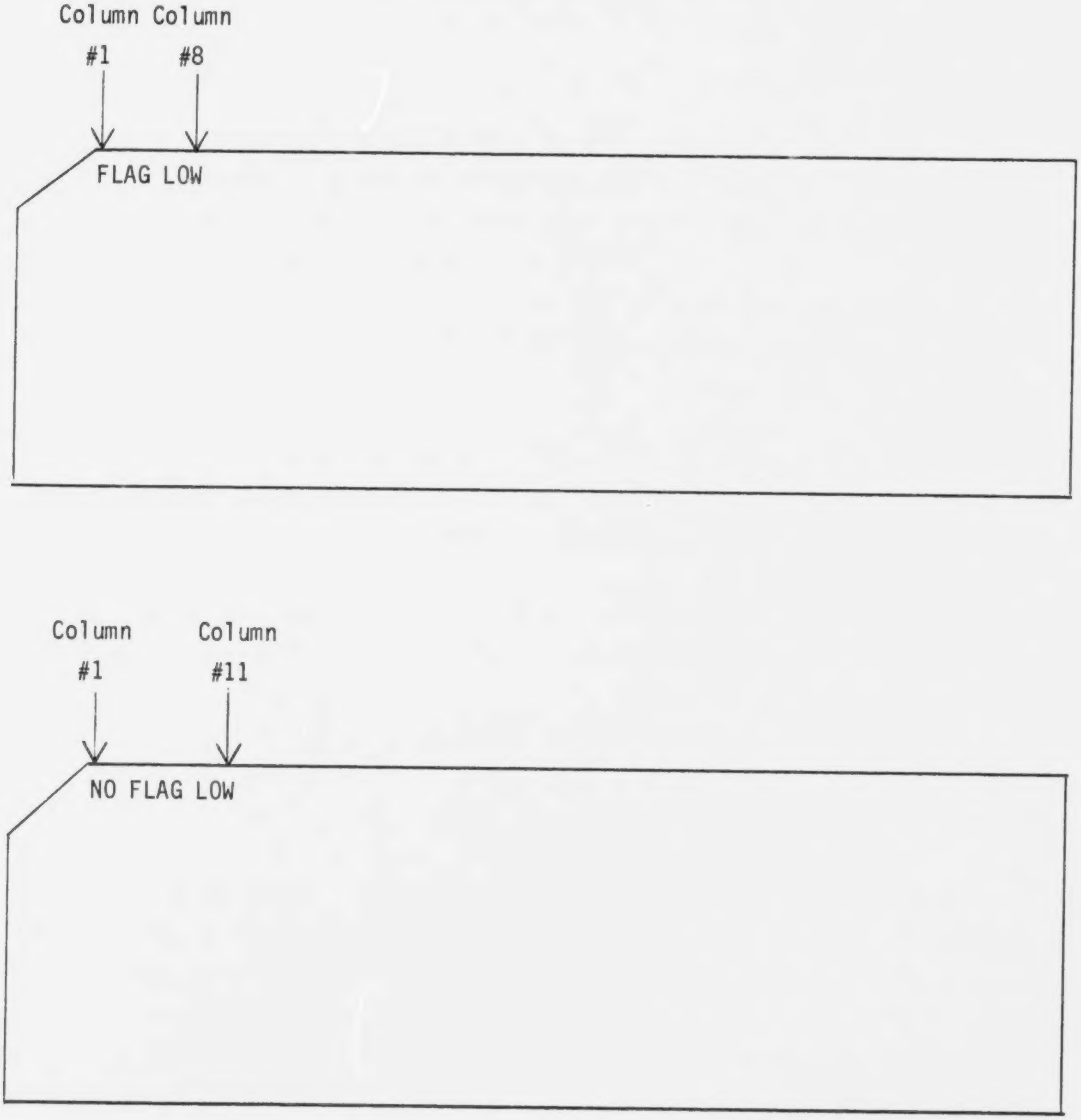


Figure 5.5.5-f. Format for the Option Card for ACVANOM (AQ0040)

5.5.6 UNITS CODE CONVERSION PROGRAM - ACVUNIT (AQ0050)

5.5.6.1 Description

The units code conversion program ACVUNIT (AQ0050) allows the user the option of producing reports in the same units as the EPA standards or in units of his own choosing. The program reads each AQDHS-II master file record (or an answer file in master file format) and creates a new master file record, changing the units code field to the optional code specified. Each data reading in the record is then converted to the new units using the conversion factor stored in the parameter file.

If no record appears in the parameter file for a given parameter code in the master file, or if no conversion factor is present in the parameter file, an error message will be printed and no conversion will take place.

Any of the reports in the AQDHS-II system can be run on a converted master or answer file. However, the converted file should be sorted before running the reports since changing the units code has changed a sort-key field (see Section 5.6.2 Master File Sorter).

5.5.6.2 File Formats

There are three input files to ACVUNIT (AQ0050). The first is an option card (see Figure 5.5.6-a). This card allows the user to specify which type of units code conversion he wants performed: STD or USER. The STD option indicates that the EPA standard units for that parameter/method code combination will appear in the new master file. The USER option indicates that units specified by the user in the parameter file will appear in the new master file. The second input file is the parameter file (see Figure

4.2.2-c for the file format). This file should contain units code and conversion factor information for all parameter/method/units code combinations on the master file. The third input file is the AQDHS-II master file (see Figure 4.5.3-a for the file format) or an answer file obtained by running a retrieval. This input master or answer file is not altered by ACVUNIT (AQ0050); a separate, converted file is produced.

There are two output files produced by ACVUNIT (AQ0050). The first is an answer file in master file format (see Figure 4.5.3-a) which contains data values converted to the specified units. This file may be out of sequence since the units code field (a sort-key field) has been changed. The master file sort program ASRMSTR (AQ0140) can be run on this answer file to generate a file in correct sort order (see Section 5.6.2). The second output file is a diagnostic report (see Figure 5.5.6-b).

5.5.6.3 Options

The user enters an option card to determine which units code will be used for the conversion. There are two options (see Figure 5.5.6-a): STD or USER. The STD option denotes that the EPA standard units code will be used for each parameter/method code combination. The USER option specifies that a user-chosen units code will be used.

For both options, the units code and conversion factor information for a given parameter/method code must be present on the parameter file before an actual conversion is made. If the information is not present, an error message will be printed and no conversion will be made. If you choose the USER option, it is your responsibility to supply the conversion factor in the parameter file.

If no option card is entered, or if the option is invalid, the default value of STD will be used.

5.5.6.4 Error Messages

ACVUNIT 001 ABORT - PARAMETER TABLE OVERFLOWED

Meaning: The input parameter file contains too many entries for the parameter table size which is set at 200. Therefore, the run was terminated.

Action: If this set size is too small, increase the size as necessary See Appendix C for instructions on increasing the allowed table size.

ACVUNIT 002 CONDITIONAL - NO OPTION CARD - DEFAULT OF STANDARD USED

Meaning: Although no option card was input, the program was executed using the 'STD' option.

Action: If the 'USER' option is desired, enter USER on the option card and resubmit the job.

ACVUNIT 003 CONDITIONAL - INVALID OPTION CARD - DEFAULT OF STANDARD USED

Meaning: Although an invalid option card was input, the program was executed using the 'STD' option.

Action: If the 'USER' option is desired, enter USER on the option card and resubmit the job.

ACVUNIT 004 CONDITIONAL - CONVERTED DATA FIELD TOO LARGE - RESULT IS INVALID

Meaning: The data value calculated was greater than 9999. A value of 9999 will appear in the output answer file.

Action: The user may want to specify a different units code and conversion factor in the parameter file.

ACVUNIT 005 CONDITIONAL - CONVERTED DATA FIELD TOO SMALL - RESULT IS INVALID

Meaning: The data value calculated was smaller than 0.0001. A value of zero will appear in the output answer file.

Action: The user may want to specify a different units code and conversion factor in the parameter file.

ACVUNIT 006 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARM TABLE SIZE

Meaning: The program has been incorrectly modified to increase the parameter table. Therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ACVUNIT 007 ABORT - BAD-PARAMETER TABLE OVERFLOWED

Meaning: The table of parameters which are not found on the parameter file has exceeded its capacity.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ACVUNIT 008 ABORT - LEVEL 77 DATA FIELD "TABLE-MAX" INCREASED BEYOND BAD-PARM-TABLE SIZE

Meaning: The program has been incorrectly modified to increase the missing parameters table. Therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

Two special error messages may be printed at the end of the program. Each message will be printed along with a listing of the parameters to which it refers.

ACVUNIT 009 THE FOLLOWING PARAMETER/METHOD/UNIT CODE COMBINATIONS WERE NOT ON THE PARAMETER FILE

Meaning: The parameter/method/unit code combinations listed were on the master file but were not on the parameter file used. No conversion was made for these codes.

Action: If necessary, update the parameter file to include the listed parameter/method/unit code combinations, then resubmit the job.

ACVUNIT 010 THE FOLLOWING PARAMETER/METHOD/UNIT CODE COMBINATIONS HAD NO CONVERSION FACTOR ON THE PARAMETER FILE

Meaning: The parameter/method/unit code combinations listed were on the master file but did not have a conversion factor on the parameter file used. No conversion was made for these codes.

Action: If necessary, update the parameter file to include conversion factors for the listed parameter/method/unit code combinations, then resubmit the job.

5.5.6.5 Cataloged JCL

5.5.6.5.1 JCL listing - ACVUNIT (AQ0050) may be run by executing the cataloged procedure AQCVM20. See Figure 5.5.6-c for a listing of this procedure.

5.5.6.5.2 Cross-reference of DD names and files

Program Name: ACVUNIT (AQ0050)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSPARMK	Parameter file	Input
AQSOPTIN	Option card	Input
AQSANSWR	Answer file in master file format	Output
AQSPRINT	Diagnostic report	Output

5.5.6.5.3 User-supplied JCL - The user must specify the data set names of the input master (or answer) file, the input parameter file, and the output answer file. Additionally, the user should include an option card to specify the type of conversion he wants performed - STD or USER. See Figure 5.5.6-d for a description of the procedure's substitutable parameters.

5.5.6.5.4 Sample run stream -The run stream listed below is from the baseline test run series. It performs a USER conversion of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQFINAL', using the parameter file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PARM', and cataloging the answer file under the name 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.CONVMF'. Sample output from this test run is shown in Figure 5.5.6-b.

```
// EXEC AQCVM20,
//      MSTRFIL=AQFINAL,
//      ANSWRFL=CONVMF,
//      PARMKFL=PARM
//CONV.OPTIONS DD *
USER
/*
```

5.5.6.6 Warnings and Special Instructions

Prior to running ACVUNIT (AQ0050), the user should insure that his parameter file contains all necessary parameter/method/unit code combinations and conversion factors. The contents of the parameter file can be seen by executing the parameter file detailed report program ARPPARM (AQ0240) (see Section 6.2.4).

ACVUNIT (AQ0050) attempts to convert all readings on the master file. If reports are needed in special units only for certain parameters, records for those parameters should be retrieved from the master file and the units code conversion run on that answer file.

The converted answer file may be out of order since the units code field (a sort-key field) has been changed. The master file sort program ASRMSTR (AQ0140) should be run after running the units code conversion if file order is important for the desired report (see Section 5.6.2).

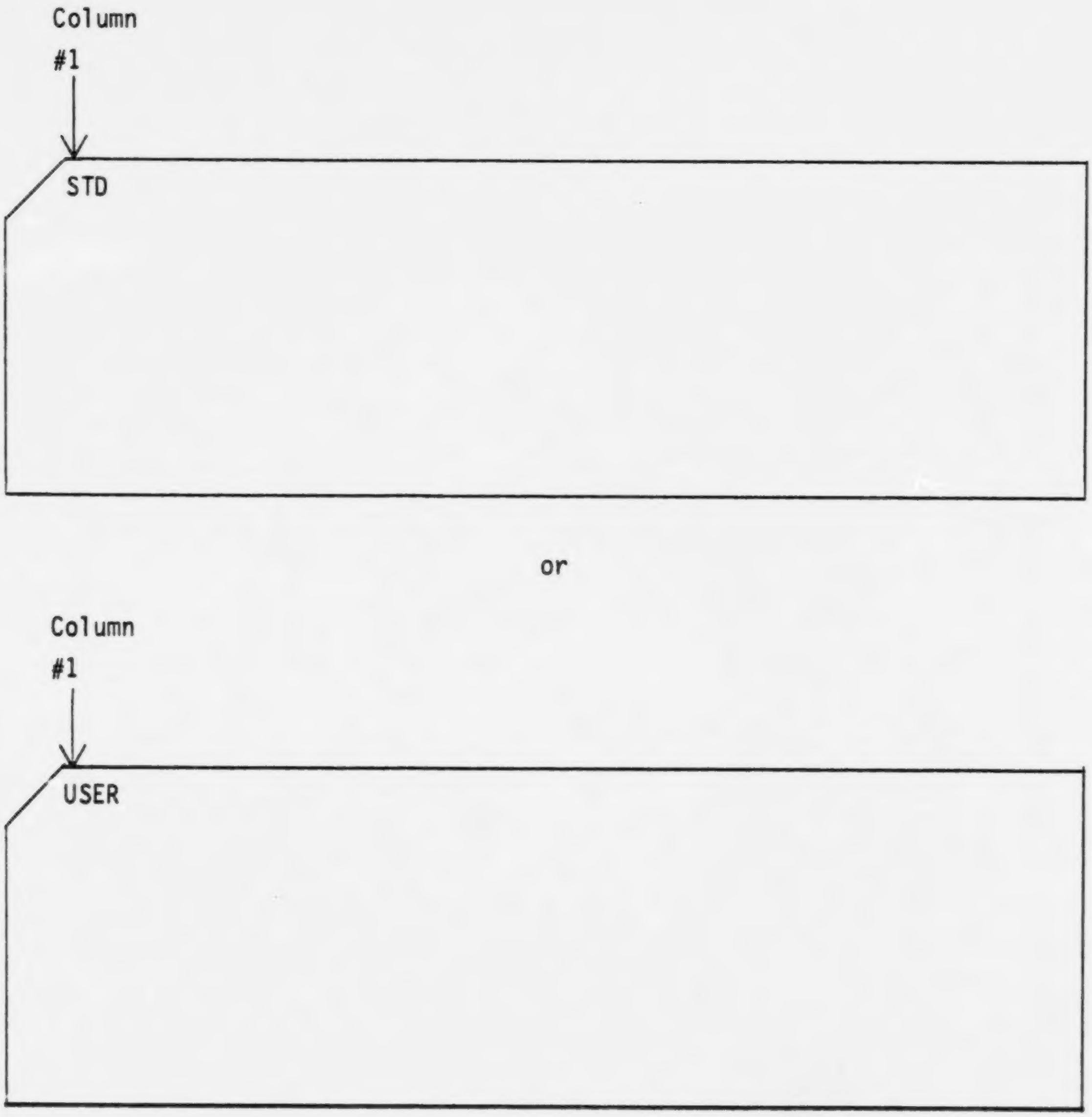
5.5.6.7 Cost Considerations

The following estimates are for the execution of ACVUNIT (AQ0050) on an IBM 370/168:

Number of master file records:	13 records
Number of readings converted:	98 readings
Number of readings not converted:	6 readings
CPU time:	.2 seconds
I/O time:	3.4 seconds
Total time:	3.6 seconds
Estimated cost:	$1.07

On an IBM-370 computer, the cost ranged from $.84 to $1.68 for a file with 114 records (700 readings). The cost differential was due to the number of errors encountered (1 at the low end, 215 at the upper end).

Obviously, the cost of converting a file increases with the size of the file. Therefore, do not convert the entire master file unless absolutely necessary. Instead, retrieve those records which must be converted (see Section 5.2 Retrieval) and run the units code conversion on that answer file. This will reduce the cost of both the conversion and the subsequent report.



The option specified must be punched beginning in Column #1 with no spaces between the letters.

Figure 5.5.6-a. Option Card Format

```
                              AQDHS-II UNITS CODE CONVERSION PROGRAM  -  DIAGNOSTIC REPORT                    PAGE     1
PROGRAM NAME: ACVUNIT (AQ0050)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
INCORPORATED: OCTOBER 31, 1978

   OPTION IS USER

NUMBER OF INPUT RECORDS:                          22
NUMBER OF OUTPUT RECORDS:                         22
NUMBER OF ERRORS DETECTED:                         0
NUMBER OF READINGS CONVERTED:                     44
NUMBER OF READINGS TOO LARGE:                      0
NUMBER OF READINGS TOO SMALL:                      0
NUMBER OF RECORDS WITH READINGS CONVERTED:        22
NUMBER OF RECORDS WITH READINGS TOO LARGE:         0
NUMBER OF RECORDS WITH READINGS TOO SMALL:         0
```

Figure 5.5.6-b. Diagnostic Report

```
//*
//*    PROCEDURE NAME: AQCVM20
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO CONVERT ALL READINGS IN AN
//*    AQDHS-II MASTER FILE TO STANDARD OR USER DEFINES UNITS
//*
//*
//AQCVM20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ACVUNIT,
//             MSTRFIL=AQMASTER,
//             ANSWRFL=AQMSTUCV,
//             PARMFIL=AQPARMFL,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             OUT=A
//*
//CONV    EXEC PGM=&PROGRAM,
//             TIME=(1,0)
//*
//*  CONVERTS DATA FROM MASTER FILE TO SPECIFIED UNITS
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - AQDHS-II MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - PARAMETER CODE FILE
//*
//AQSPARMK  DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - OPTION CARD
//*
//AQSINPUT  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//*  OUTPUT DATA SET - ANSWER FILE WITH CONVERTED DATA VALUES
//*
//AQSANSWR  DD DSNAME=&PROJECT..DATA.&ANSWRFL,
//             DISP=(&DISP),
//             UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY))
//*
//*  OUTPUT DATA SET - DIAGNOSTIC MESSAGES
```

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Figure 5.5.6-c. Cataloged Procedure AQCVM20

```
//*                                                                     00005900
//AQSPRINT  DD SYSOUT=&OUT                                              00006000
//*                                                                     00006100
//*  OUTPUT DATA SET - SYSTEM OPERATIONS                                00006200
//*                                                                     00006300
//SYSPRINT  DD SYSOUT=&OUT                                              00006400
//*                                                                     00006500
//SYSOUT    DD SYSOUT=&OUT                                              00006600
//*                                                                     00006700
//SYSDBOUT  DD SYSOUT=&OUT                                              00006800
//*                                                                     00006900
//SYSUDUMP  DD SYSOUT=&OUT                                              00007000
//*                                                                     00007100
//SYSDTERM  DD SYSOUT=&OUT                                              00007200
//*                                                                     00007300
```

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Figure 5.5.6-c - continued. Cataloged Procedure AQCVM20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g. CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER would be the full data set name of the AQDHS-II master file)
PROGRAM	ACVUNIT	Units code conversion program
MSTRFIL	AQMASTER	Lowest-level index of master file
ANSWRFL	AQMSTUCV	Lowest-level index of answer file
PARMKFL	AQPARMFL	Lowest-level index of parameter file
UNIT	3330	Unit type to which answer file is to be written
SERIAL	CDHSPK	Volume serial number of volume to which answer file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of answer file
SPCUNIT	TRK	Units in which space for answer file is to be allocated
PRIMARY	20	Primary space allocation for answer file
SECNDRY	10	Secondary space allocation for answer file
OUT	A	SYSOUT class for all print files

Figure 5.5.6-d. Substitutable Parameters for AQCVM20

5.6 MASTER FILE SORTING

5.6.1 INTRODUCTION

The master file maintenance program, AFMMSTR (AQ0100), produces a master file in the standard sort sequence (i.e. the records are ordered by the master file sequence key shown in figure 4.5.3-a). Also, any answer file produced from a master file by a non-batched retrieval is in master file standard sort sequence. However, some AQDHS-II reports require that the input master file be sorted in an order other than the standard sort sequence. The master file sort program, ASRMSTR (AQ0140), allows the user to sort the master file or answer file into the sort sequences required to produce the statistical analysis report, the inventory by site report, and the inventory by pollutant report.

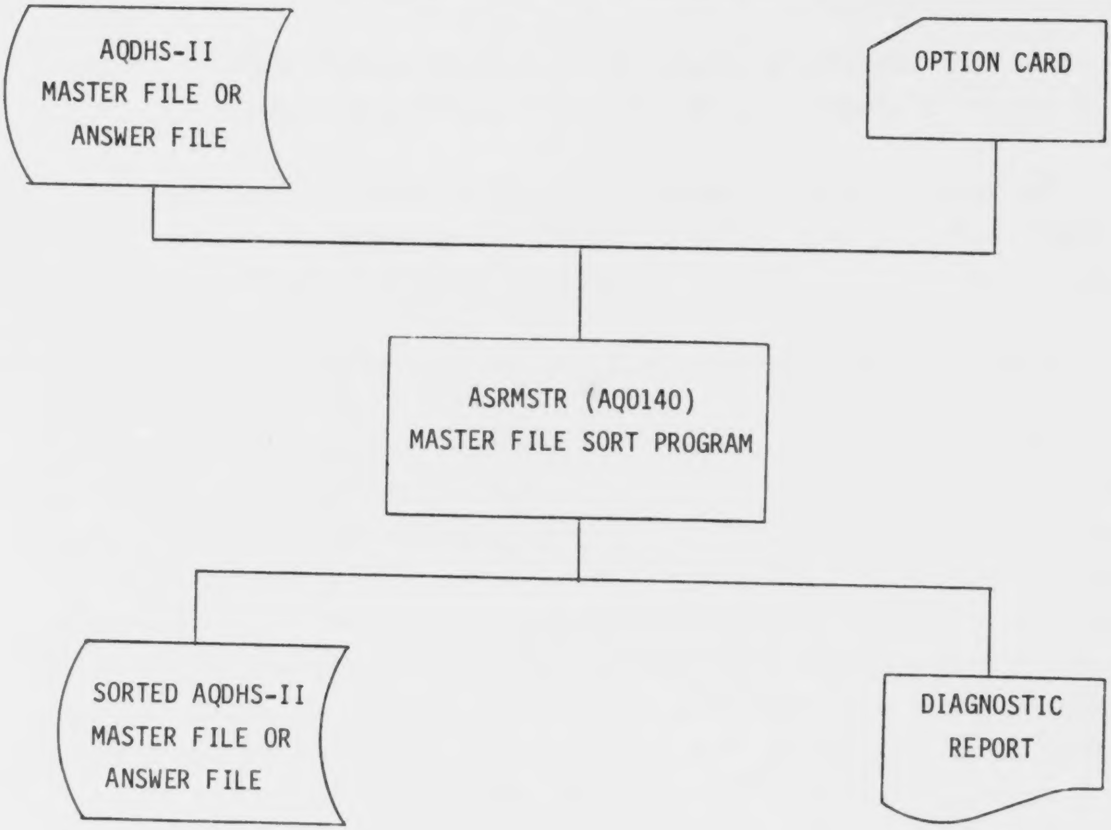
Answer files produced by batched retrievals are not sorted by the retrieval programs. ASRMSTR (AQ0140) allows the user to sort an answer file by batch number, i.e., to group together the records selected by each of the batched retrievals. Furthermore, the user may sort the answer file from batched retrievals so that records selected by each of the batched retrievals are sorted into the order required to produce the statistical analysis report, the inventory by site report, or the inventory by pollutant report.

Only a master file in the standard sort sequence may be used as input to the master file maintenance program, AFMMSTR (AQ0100). When a master file is sorted into any order other than the standard sort sequence by ASRMSTR (AQ0140), the input master file (in standard sort sequence) should be retained. Thus, it should never be necessary to sort the master file into the standard sort sequence. However, ASRMSTR (AQ0140) does enable the user to sort the master file or any answer file into the standard sort sequence. This capability allows the user to restore a master file to the standard sort sequence. For example, an answer file created by ACVUNIT (AQ0050), the units code conversion program, can be restored to standard sort sequence.

The master file sort flowchart is shown in Figure 5.6.1-a. ASRMSTR (AQ0140) sorts the input master or answer file according tc the order specified on the option card. A diagnostic report is produced.

A detailed discussion of ASRMSTR (AQ0140) is presented in section 5.6.2.

ASRMSTR (AQ0140) may be executed using the cataloged procedure AQSRM10, which is discussed in Section 5.6.2.5. A sample job stream for sorting a master file is shown in Section 5.6.2.5.4. A sample job stream in which an answer file from batched retrievals is sorted is shown in section 7.2.7. It should be noted that AQRPM35, the cataloged procedure for producing the inventory by site report, and AQRPM40, the cataloged procedure for producing the inventory by pollutant report, contain steps to sort the input master or answer file, since sorting is always required before producing the inventory by site or inventory by pollutant report. However, AQRPM10, the cataloged procedure for producing the statistical analysis report, does not include a step for sorting the input master or answer file , as sorting is not always required before producing the statistical analysis report. Sample run streams for producing the inventory by site, inventory by pollutant, and statistical analysis reports are shown in Sections 6.4.4.5.4, 6.4.5.5.4, and 6.4.2.5.4, respectively.



AQDHS-II MASTER FILE OR ANSWER FILE
OPTION CARD
ASRMSTR (AQ0140) MASTER FILE SORT PROGRAM
SORTED AQDHS-II MASTER FILE OR ANSWER FILE
DIAGNOSTIC REPORT

Figure 5.6.1-a. Master File Sort Flowchart

5.6.2 MASTER FILE SORT PROGRAM - ASRMSTR (AQ0140)

5.6.2.1 Description

ASRMSTR (AQ0140) sorts an AQDHS-II master or answer file into the various sequences required by the AQDHS-II report programs. A master or answer file must be sorted prior to the execution of the following programs: the preliminary statistics program, ASTPRLM (AQ0190), the inventory by site report program, ARPINVS (AQ0280); and the inventory by pollutant report program ARPINVP (AQ00290). ASTPRLM (AQ0190) and ARPINVS (AQ0280) require that the master or answer file be sorted by site code; however, ARPINVP (AQ0290) requires that the file be sorted by parameter code. Also, batched retrieval answer files must be sorted prior to being input to any of the report programs. In addition to these sorts, ASRMSTR (AQ0140) can sort an out-of-sequence master or answer file into the standard master file sequence.

5.6.2.2 File Formats

Input to ASRMSTR (AQ0140) consists of an AQDHS-II master or answer file and an option card. See Figure 4.5.3-a for the format of the master file. For a detailed description of the option card, refer to Section 5.6.2.3.

Output from this program consists of the sorted AQDHS-II master or answer file and a diagnostic report. The format for the output master or answer file is the same as that of the input file; however, the sequence of the file records may have been changed. The various sequences into which the master file may be sorted are described in detail in the next section. An example of the diagnostic report is shown in Figure 5.6.2-a.

5.6.2.3 Options

The options specify the sequence into which the the master or answer file is to be sorted. The option card has two fields, which are represented in Figure 5.6.2-b as '[one]' and '[two]'. By entering BATCH in the first field (i.e., card columns 1 through 5), the BATCH option can be specified to sort the master or answer file into the sequence shown in Figure 5.6.2-c. This option is used to sort batched retrieval answer files; the field should be left blank for other types of input files.

In the second field (i.e., card columns 7 through 10), PARM, SITE, STAT, or STND can be entered. Also, the field could be left blank. The PARM option sorts the master or answer file by parameter code into the sequence shown in Figure 5.6.2-d, whereas the SITE and STAT options sort the master or answer file by site code. The sort sequence for the SITE and STAT options is shown in Figure 5.6.2-e. The STND option sorts the file into the standard master file sequence; i.e., the sequence created by the master file maintenance program, AFMMSTR (AQ0100). Figure 5.6.2-f shows the sort sequence for the STND option.

Any of the four second-field options may be used in conjunction with the BATCH option or by themselves. The result of combining the BATCH option with either the PARM, SITE, STAT, or STND option is the addition of one field, the batch retrieval code (see Figure 5.6.2-c), at the top of the respective sort sequence. This ability to combine the two types of options allows the user to 'separate' the batched retrieval answer files while sorting them into the sequence required for a particular report.

If no option card is entered, the default of STND is assumed. The run will be aborted if an invalid word appears in either of the option fields or if both fields are blank. That is, a blank option card will be considered invalid and cause the run to abort.

5.6.2.4 Error Messages

ASRMSTR 001 ABORT - INVALID OPTION SPECIFIED

Meaning: Either an invalid option word is contained in columns 1 through 5 or 7 through 10 of the option card, or both fields are blank. Therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

5.6.2.5 Cataloged JCL

5.6.2.5.1 JCL listing - ASRMSTR (AQ0140) is executed by the cataloged procedure AQSRM10. See Figure 5.6.2-g for a listing of this procedure.

5.6.2.5.2 Cross-reference of DD names and files

Program Name: ASRMSTR (AQ0140)

DD Name	File Description	Input/Output
AQSINPUT	AQDHS-II master file	Input
AQSOPTIN	Option card	Input
SORTWK01	Sort work file	Internal
AQSOUTPT	Sorted AQDHS-II master file	Output
AQSPRINT	Diagnostic report	Output

5.6.2.5.3 User-supplied JCL -To execute the cataloged procedure AQSRM10, the user must supply the job accounting information and the data set names of the AQDHS-II master file and the sorted AQDHS-II master file. See Figure 5.6.2-h for a description of the procedure's substitutable parameters. The user must also supply an option card to specify the desired sort sequence.

5.6.2.5.4 Sample run stream - The following run stream would produce a sorted AQDHS-II master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TSPG72S. The input AQDHS-II master file is named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TSPG72, the SITE sort sequence is specified.

```
// EXEC  AQSRM10,
//       MSTRFIL=TSPG72,
//       SORTFIL=TSPG72S
//SORT.OPTIONS  DD  *
     SITE
/*
```

5.6.2.6 Warnings and Special Instructions

The run will be aborted if card columns 1 through 5 or 7 through 10 of the option card contain anything other than the valid option words for a particular field, or if both fields are blank. The standard option (STND) is the default when an option is not specified by the user.

Note that the COBOL sort verb is used in this program; therefore, the collating sequence for alphanumeric fields is determined by the computer at the user's particular installation.

In addition to the diagnostic report produced by ASRMSTR (AQ0140), messages generated by the sort-merge package will be printed. The format and content, as well as the physical location, of these messages depend upon the user's particular installation.

The file produced by ASRMSTR (AQ0140) may have records with duplicate keys if the input file was produced by the units code conversion program, ACVUNIT (AQ0050). Also the file produced by ASRMSTR (AQ0140) may not contain all the data on the current active master file if the input file was produced by a retrieval. Thus the file produced by ASRMSTR (AQ0140) should not be used as input to a master file maintenance activity unless the user is sure that the file produced by ASRMSTR (AQ0140) reflects a valid, current master file.

5.6.2.7 Cost Considerations

The following estmates are for the execution of ASRMSTR (AQ0140) on an IBM 370/168:

Number of sorted master file records:	13 records
CPU time:	.4 seconds
I/O time:	9.9 seconds
Total time:	10.3 seconds
Estimated cost:	$1.65

5.6.2.8 Related Programs and Procedures

ASRMSTR (AQ0140) can be executed by the cataloged procedure AQSRM10 which is described in Section 5.6.2.5. ASRMSTR (AQ0140) can also be executed in conjunction with ARPINVS (AQ0280) or ARPINVP (AQ0290). Section 6.4.4.5 describes the cataloged procedure AQRPM40, which executes both ASRMSTR (AQ0140) and ARPINVS (AQ0280); Section 6.4.5.5 describes the cataloged procedure AQRPM35, which executes ASRMSTR (AQ0140) and ARPINVS (AQ0280).

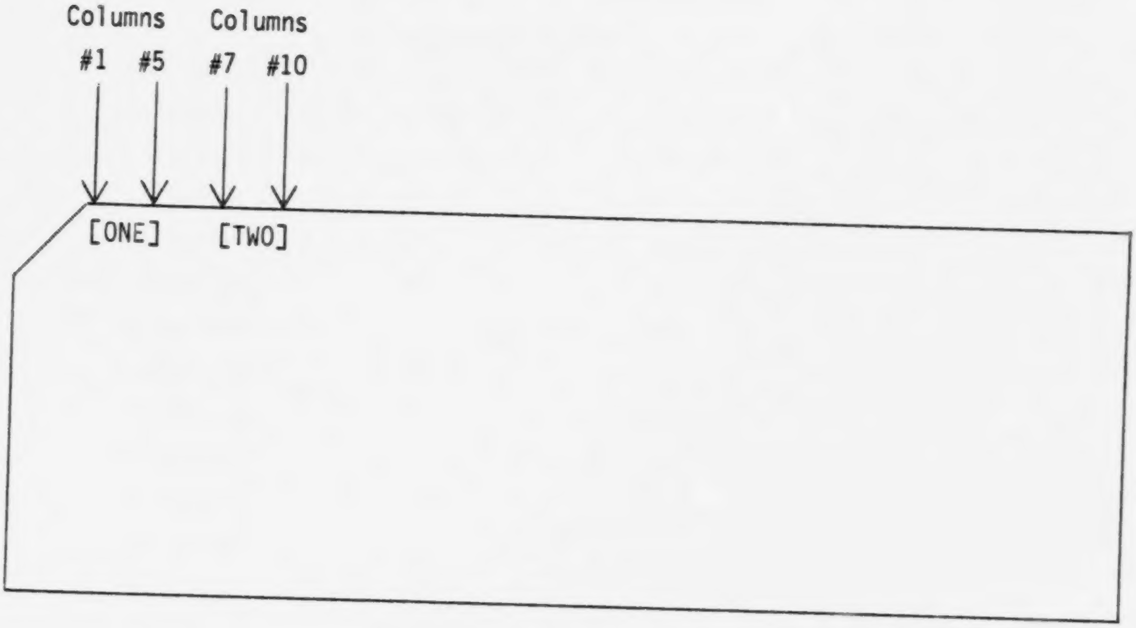
```
                    AQDHS-II MASTER FILE SORT PROGRAM  -  DIAGNOSTIC REPORT                          PAGE     1

PROGRAM NAME: ASRMSTR (AQ0140)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

SORT OPTION SPECIFIED:        STAT


NUMBER OF INPUT RECORDS READ:              6
NUMBER OF MASTER RECORDS WRITTEN:          6
NUMBER OF DIAGNOSTIC MESSAGES:             0
```

Figure 5.6.2-a. Diagnostic Report



The options must be specified in the indicated fields; all other columns must contain blanks.

Figure 5.6.2-b. Option Card Format

Record Position	Description	Sort Order
1	Batch Retrieval Code	Ascending
8 - 9	State Code	Ascending
10 - 12	AQCR Code	Ascending
13 - 16	County Code	Ascending
17 - 20	Area Code	Ascending
21 - 23	Site Code	Ascending
24	Agency Code	Ascending
25 - 26	Project Code	Ascending
27	Time Code	Ascending
28 - 29	Year	Ascending
30 - 34	Parameter Code	Ascending
35 - 36	Method Code	Ascending
37 - 38	Units Code	Ascending
39 - 40	Month	Ascending
41 - 42	Day	Ascending
43 - 44	Start Hour	Ascending

Figure 5.6.2-c. Sort Sequence for BATCH Option

Record Position	Description	Sort Order
30 - 34	Parameter Code	Ascending
35 - 36	Method Code	Ascending
8 - 9	State Code	Ascending
10 - 12	AQCR Code	Ascending
13 - 16	County Code	Ascending
17 - 20	Area Code	Ascending
21 - 23	Site Code	Ascending
24	Agency Code	Ascending
25 - 26	Project Code	Ascending
27	Time Code	Ascending
28 - 29	Year	Ascending
37 - 38	Units Code	Ascending
39 - 40	Month	Ascending
41 - 42	Day	Ascending
43 - 44	Start Hour	Ascending

Figure 5.6.2-d. Sort Sequence for PARM Option

Record Position	Description	Sort Order
8 - 9	State Code	Ascending
10 - 12	AQCR Code	Ascending
13 - 16	County Code	Ascending
17 - 20	Area Code	Ascending
21 - 23	Site Code	Ascending
24	Agency Code	Ascending
25 - 26	Project Code	Ascending
30 - 34	Parameter Code	Ascending
35 - 36	Method Code	Ascending
37 - 38	Units Code	Ascending
27	Time Code	Ascending
28 - 29	Year	Ascending
39 - 40	Month	Ascending
41 - 42	Day	Ascending
43 - 44	Start Hour	Ascending

Figure 5.6.2-e. Sort Sequence for SITE and STAT Option

Record Position	Description	Sort Order
8 - 9	State Code	Ascending
10 - 12	AQCR Code	Ascending
13 - 16	County Code	Ascending
17 - 20	Area Code	Ascending
21 - 23	Site Code	Ascending
24	Agency Code	Ascending
25 - 26	Project Code	Ascending
27	Time Code	Ascending
28 - 29	Year	Ascending
30 - 34	Parameter Code	Ascending
35 - 36	Method Code	Ascending
37 - 38	Units Code	Ascending
39 - 40	Month	Ascending
41 - 42	Day	Ascending
43 - 44	Start Hour	Ascending

Figure 5.6.2-f. Sort Sequence for STND Option

```
//*
//*    PROCEDURE NAME: AQSRM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO SORT THE AQDHS-II MASTER FILE
//*
//*
//AQSRM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ASRMSTR,
//             TIME1='1,0',
//             MSTRFIL=AQMASTER,
//             SORTFIL=AQMSTSRT,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,PASS',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             SORUNIT=CYL,
//             WORKSPC=50,
//             OUT=A,
//             TEMP=SYSDA
//*
//SORT    EXEC PGM=&PROGRAM,
//             REGION=100K,
//             TIME=(&TIME1)
//*
//*  SORT MASTER FILE
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SORTLIB   DD DSNAME=SYS1.SORTLIB,
//             DISP=(SHR,PASS)
//*
//SORTWK01  DD UNIT=&TEMP,
//             SPACE=(&SORUNIT,(&WORKSPC),,CONTIG)
//*
//SORTWK02  DD UNIT=&TEMP,
//             SPACE=(&SORUNIT,(&WORKSPC),,CONTIG)
//*
//SORTWK03  DD UNIT=&TEMP,
//             SPACE=(&SORUNIT,(&WORKSPC),,CONTIG)
//*
//*  INPUT DATA SET - MASTER FILE
//*
//AQSINPUT  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - OPTION CARDS
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
```

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Figure 5.6.2-g. Cataloged Procedure AQSRM10

```
//*  OUTPUT DATA SET - SORTED MASTER FILE
//*
//AQSOUTPT  DD DSNAME=&PROJECT..DATA.&SORTFIL,
//             UNIT=&UNIT,
//             VOLUME=SER=&SERIAL,
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY))
//*
//*  OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//*  OUTPUT DATA SET - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

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Figure 5.6.2-g - Continued. Cataloged Procedure AQSRM10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FTMSTRAA would be the full data set name of the AQDHS-II master file)
PROGRAM	ASRMSTR	Master file sort program
TIME1	'1,0'	Time allocated for execution of ASRMSTR
MSTRFIL	AQMASTER	Lowest-level index of unsorted master file
SORTFIL	AQMSTSRT	Lowest-level index of sorted master file
UNIT	3330	Unit type to which sorted master file is to be written
SERIAL	CDHSPK	Volume serial number of the volume to which the sorted master file is to be written
DISP	'NEW,PASS'	Disposition of sorted master file
SPCUNIT	TRK	Units in which space for sorted master file is to be allocated
PRIMARY	20	Primary space allocation for sorted master file
SECNDRY	10	Secondary space allocation for sorted master file
SORUNIT	CYL	Units in which space for the sort work file is to be allocated
WORKSPC	50	Number of units to be allocated for the sort work space
OUT	A	SYSOUT class for all print files
TEMP	SYSDA	Unit type for temporary work space

Figure 5.6.2-h. Substitutable Parameters for AQSRM10

5.7 MULTI-PROGRAM PROCEDURES

5.7.1 RETRIEVAL PROCEDURE - AQRTM10

5.7.1.1 Cataloged JCL

The cataloged procedure AQRTM10 executes the retrieval language processor program, ARTLNGP (AQ0110), then compiles, link-edits, and executes the generated retrieval program ARTGENR (AQ0120). The load module for the generated retrieval program is not saved. For information on the cataloged procedure AQRTM20, which executes the retrieval language processor program, then compiles, link-edits, and saves the generated retrieval load module, see Section 5.2.2.5. Information on the cataloged procedure AQRTM30, which executes the retrieval load module stored by AQRTM20 can be found in Section 5.2.3.5. Information on ARTLNGP (AQ0110) and ARTGENR (AQ0120) can be found in Section 5.2.

5.7.1.1.1 JCL listing - Figure 5.7.1-a contains a listing of the cataloged procedure AQRTM10.

5.7.1.1.2 Cross-reference of DD names and files

Program Name: ARTLNGP (AQ0110)

DD Name	File Description	Input/Output
AQSINPGM	Retrieval skeleton program	Input
AQSINPUT	Retrieval specification cards	Input
AQSRTRVR	Retrieval source program	Output
AQSPRINT	Diagnostic report	Output

Program Name: ARTGENR (AQ0120)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSANSWR	Retrieved answer file	Output
AQSPMSTR	Answer file listing	Output
AQSPRINT	Diagnostic report	Output

5.7.1.1.3 <u>User-supplied JCL</u> - To execute the cataloged procedure AQRTM10, the user must supply job accounting information and the data set names of the AQDHS-II master file and the answer file. See Figure 5.7.1-b for a description of the procedure's substitutable parameters. The retrieval specification cards must also be supplied.

5.7.1.1.4 <u>Sample run stream</u> - The following run stream uses the procedure AQRTM10; it is from AQDHS-II the baseline test run series. The input AQDHS-II master file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQ102076' and the output answer file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.S02G79'. The answer file is to be cataloged so that is may be used in later runs. All records for 1979 or later with parameter code 42401 (S02) will be retrieved.

```
// EXEC  AQRTM10,
//       MSTRFIL=AQ102076,
//       ANSWRFL=S02G79,
//       DISP='NEW,CATLG,DELETE'
//COMPILE.INPUT DD *
$$SELECT
PARAMETER-CODE        = '42401'                           AND
YEAR                 N < '79'
$$END
/*
```

```
//*
//*    PROCEDURE NAME: AQRTM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO CREATE AN AQDHS-II GENERATED
//*    RETRIEVAL PROGRAM, COMPILE AND LINK-EDIT THE PROGRAM, AND THEN
//*    RETRIEVE DATA FROM THE AQDHS-II MASTER FILE
//*
//*
//AQRTM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARTLNGP,
//             TIME1='20,0',
//             TEMP=SYSDA,
//             MSTRFIL=AQMASTER,
//             ANSWRFL=AQANSWER,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,PASS,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             MEMBER=ARTSKEL,
//             OUT=A
//*
//COMPILE EXEC PGM=&PROGRAM,
//             REGION=70K,
//             TIME=(1,0)
//*
//* PRODUCE AQDHS-II RETRIEVAL PROGRAM
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - RETRIEVAL PROGRAM SKELETON
//*
//AQSINPGM  DD DSNAME=&PROJECT..SOURCE(&MEMBER),
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - RETRIEVAL SPECIFICATION CARDS
//*
//AQSINPUT  DD DDNAME=INPUT,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - GENERATED RETRIEVAL PROGRAM
//*
//AQSRTRVR  DD UNIT=&TEMP,
//             DISP=(NEW,PASS),
//             SPACE=(TRK,(5,2),RLSE),
//             DSNAME=&&PROGRAM,
//             DCB=BLKSIZE=3360
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
```

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Figure 5.7.1-a. Cataloged Procedure AQRTM10

```
//*                                                                     00005900
//AQSPRINT  DD SYSOUT=&OUT                                              00006000
//*                                                                     00006100
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006200
//*                                                                     00006300
//SYSPRINT  DD SYSOUT=&OUT                                              00006400
//*                                                                     00006500
//SYSOUT    DD SYSOUT=&OUT                                              00006600
//*                                                                     00006700
//SYSDBOUT  DD SYSOUT=&OUT                                              00006800
//*                                                                     00006900
//SYSDTERM  DD SYSOUT=&OUT                                              00007000
//*                                                                     00007100
//SYSUDUMP  DD SYSOUT=&OUT                                              00007200
//*                                                                     00007300
//COBOL   EXEC PGM=IKFCBL00,                                            00007400
//  PARM='SIZE=114K,BUF=30K,NOSEQ,NOSOURCE,SUPMAP,LIB,STATE,FLOW=10',   00007500
//             REGION=175K,                                             00007600
//             TIME=(2,0)                                               00007700
//*                                                                     00007800
//* COMPILE RETRIEVAL PROGRAM                                           00007900
//*                                                                     00008000
//*                                                                     00008100
//* INPUT DATA SET - SOURCE LIBRARY                                     00008200
//*                                                                     00008300
//SYSLIB    DD DSNAME=&PROJECT..SOURCE,                                 00008400
//             VOLUME=(PRIVATE,RETAIN),                                 00008500
//             DISP=(SHR,PASS)                                          00008600
//*                                                                     00008700
//* INPUT DATA SET - COBOL RETRIEVAL PROGRAM SOURCE CODE                00008800
//*                                                                     00008900
//SYSIN     DD DSNAME=&&PROGRAM,                                        00009000
//             DISP=(OLD,DELETE)                                        00009100
//*                                                                     00009200
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00009300
//*                                                                     00009400
//SYSPRINT  DD SYSOUT=&OUT                                              00009500
//*                                                                     00009600
//* OUTPUT DATA SET - COBOL RETRIEVAL PROGRAM OBJECT CODE               00009700
//*                                                                     00009800
//SYSLIN    DD UNIT=&TEMP,                                              00009900
//             DISP=(NEW,PASS),                                         00010000
//             SPACE=(TRK,(5,2),RLSE),                                  00010100
//             DSNAME=&&OBJMOD                                          00010200
//*                                                                     00010300
//* UTILITY DATA SETS                                                   00010400
//*                                                                     00010500
//SYSUT1    DD UNIT=&TEMP,                                              00010600
//             SPACE=(TRK,(50,100))                                     00010700
//*                                                                     00010800
//SYSUT2    DD UNIT=(&TEMP,SEP=SYSUT1),                                 00010900
//             SPACE=(TRK,(50,100))                                     00011000
//*                                                                     00011100
//SYSUT3    DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2)),                        00011200
//             SPACE=(TRK,(50,100))                                     00011300
//*                                                                     00011400
//SYSUT4    DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2,SYSUT3)),                 00011500
//             SPACE=(TRK,(50,100))                                     00011600
```

(page 2 of 4)

Figure 5.7.1-a - continued. Cataloged Procedure AQRTM10

```
//*
//LKED    EXEC PGM=IEWL,                                                00011700
//             PARM='LIST,LET,XREF',                                    00011800
//             COND=(5,LT,COBOL),                                       00011900
//             REGION=100K,                                             00012000
//             TIME=(1,0)                                               00012100
//*                                                                     00012200
//* LINK-EDIT RETRIEVAL                                                 00012300
//*                                                                     00012400
//*                                                                     00012500
//* INPUT DATA SET - AUTO-CALL LIBRARY                                  00012600
//SYSLIB    DD DSNAME=&PROJECT..LOAD,                                   00012700
//             VOLUME=(PRIVATE,RETAIN),                                 00012800
//             DISP=(SHR,PASS)                                          00012900
//          DD DSNAME=SYS1.COBLIB,                                      00013000
//             DISP=(SHR,PASS)                                          00013100
//*                                                                     00013200
//* INPUT DATA SET - COBOL RETRIEVAL PROGRAM OBJECT CODE                00013300
//*                                                                     00013400
//SYSLIN    DD DSNAME=&&OBJMOD,                                         00013500
//             DISP=(OLD,DELETE)                                        00013600
//          DD DDNAME=INPUT,                                            00013700
//             DCB=BLKSIZE=80                                           00013800
//*                                                                     00013900
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00014000
//*                                                                     00014100
//SYSPRINT  DD SYSOUT=&OUT                                              00014200
//*                                                                     00014300
//* OUTPUT DATA SET - COBOL RETRIEVAL PROGRAM LOAD MODULE               00014400
//*                                                                     00014500
//SYSLMOD   DD UNIT=&TEMP,                                              00014600
//             DISP=(MOD,PASS),                                         00014700
//             SPACE=(TRK,(10,5,1)),                                    00014800
//             DSNAME=&&LOADMOD(RETRIEVE)                               00014900
//*                                                                     00015000
//* UTILITY DATA SET                                                    00015100
//*                                                                     00015200
//SYSUT1    DD UNIT=&TEMP,                                              00015300
//             SPACE=(TRK,(10,5))                                       00015400
//*                                                                     00015500
//RETRIEVE EXEC PGM=*.LKED.SYSLMOD,                                     00015600
//             COND=((5,LT,COBOL),(5,LT,LKED)),                         00015700
//             REGION=60K,                                              00015800
//             TIME=(&TIME1)                                            00015900
//*                                                                     00016000
//* RETRIEVE ANSWER FILE FROM MASTER FILE                               00016100
//*                                                                     00016200
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00016300
//             VOLUME=(PRIVATE,RETAIN),                                 00016400
//             DISP=(SHR,PASS)                                          00016500
//          DD DSNAME=SYS1.COBLIB,                                      00016600
//             DISP=(SHR,PASS)                                          00016700
//*                                                                     00016800
//* INPUT DATA SET - MASTER FILE                                        00016900
//*                                                                     00017000
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,                          00017100
//             VOLUME=(PRIVATE,RETAIN),                                 00017200
//             DISP=(SHR,PASS)                                          00017300
                                                                        00017400
```

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(page 3 of 4)

Figure 5.7.1-a - continued. Cataloged Procedure AQRTM10

```
//*
//* OUTPUT DATA SET - ANSWER FILE
//*
//AQSANSWR  DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&ANSWRFL
//*
//* OUTPUT DATA SET - ANSWER FILE CONFIRMATION LISTING
//*
//AQSPMSTR  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//DELETE  EXEC PGM=IEFBR14,
//             REGION=4K,
//             TIME=(0,5)
//LOADMOD   DD DSNAME=&&LOADMOD,
//             DISP=(OLD,DELETE)
//*
```

(page 4 of 4)

Figure 5.7.1-a - continued. Cataloged Procedure AQRTM10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQMASTER would be the full data set name of an AQDHS-II master file)
PROGRAM	ARTLNGP	Retrieval language processor program
TIME1	'20,0'	Time for execution of generated retrieval program
TEMP	SYSDA	Unit type for temporary work space
MSTRFIL	AQMASTER	Lowest-level index of master file
ANSWRFL	AQANSWER	Lowest-level index of answer file
UNIT	3330	Unit type to which the answer file is to be written
SERIAL	CDHSPK	Volume serial number of volume to which answer file is to be written
DISP	'NEW,PASS,DELETE'	Disposition of answer file
SPCUNIT	TRK	Units in which space for answer file is to be allocated
PRIMARY	20	Primary space allocation for answer file
SECNDRY	10	Secondary space allocation for answer file
MEMBER	ARTSKEL	Retrieval skeleton program
OUT	A	SYSOUT class for all print files

Figure 5.7.1-b. Substitutable Parameters for AQRTM10

6.0 REPORTS

6.1 INTRODUCTION

AQDHS-II provides the user with the capability to produce many reports. These reports can be categorized as (1) file listings, which present the contents of files with little or no accompanying analysis; (2) EPA-required reports; and (3) summary reports, which present the results of various analyses of files.

6.2 FILE LISTINGS

6.2.1 INTRODUCTION

The master file or any answer file may be listed using the master file formatted dump program, ARPDUMP (AQ0310), or the master file detailed report program, ARPMSTR (AQ0230).

ARPDUMP (AQ0310) lists the master or answer file, record by record, with appropriate identifying headers. It is primarily used to verify the contents of the master file, especially when investigating a suspected AQDHS-II malfunction.

ARPMSTR (AQ0230) lists the master or answer file in a format suitable for a management report. Appropriate headings are printed, including narrative descriptions from the parameter, site, and parameter standards files. The readings from the master or answer file are printed in table form with appropriate row and column headings. Also, a limited amount of statistics are computed and printed.

ARPMSTR (AQ0230) is also used in producing the sliding average report, which is discussed in Section 5.3.1.2.

The master file formatted dump flowchart and master file detailed report flowchart are shown in Figures 6.2.1-a and 6.2.1-b, respectively. Both ARPDUMP (AQ0310) and ARPMSTR (AQ0230) provide a listing of the master file or any answer file; ARPMSTR (AQ0230) accesses the parameter, site, and parameter standards files in addition to the master or answer file. ARPMSTR (AQ0230) produces a diagnostic report, whereas ARPDUMP (AQ0310) prints the information usually contained in a diagnostic report at the beginning and end of the formatted dump.

Detailed discussions of ARPDUMP (AQ0310) and ARPMSTR (AQ0230) are presented in Sections 6.2.2 and 6.2.3, respectively.

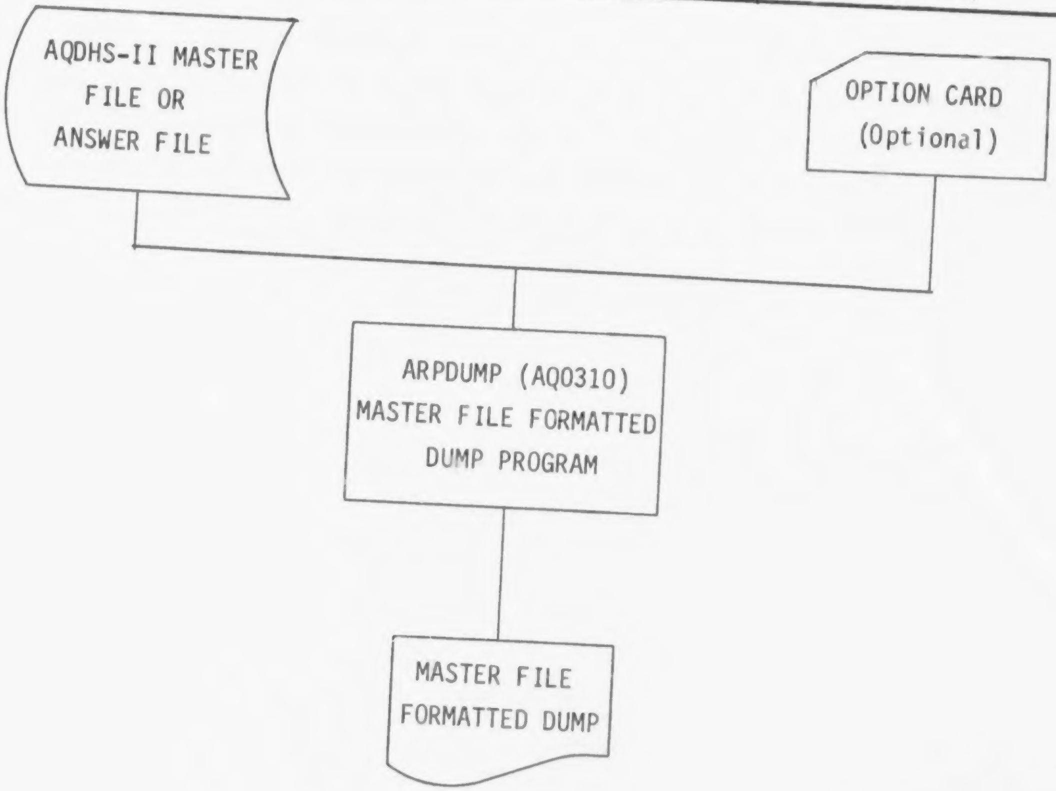
ARPDUMP (AQ0310) can be executed using the cataloged procedure AQRPM25, which is discussed in Section 6.2.2.5. A sample run stream to produce a dump of a master file is shown in Section 6.2.2.5.4. ARPMSTR (AQ0230) can be executed using the cataloged procedure AQRPM20, which is discussed in Section 6.2.3.5. Sample run streams to produce a detailed report of the master file are shown in Section 6.2.3.5.4. A sample run stream using ARPMSTR (AQ0230) in the production of a sliding average report is shown in Section 7.2.6.

The auxiliary files (the parameter, parameter standards, and site files) may be listed using the parameter file detailed report program, ARPPARM (AQ0240); the parameter standards file detailed report program, ARPSTND (AQ0250); and the site file detailed report program, ARPSITE (AQ0260), respectively.

Figures 6.2.1-c, 6.2.1-d, and 6.2.1-e present the parameter file detailed report flowchart, the parameter standards file detailed report flowchart, and the site file detailed report flowchart. ARPPARM (AQ0240) and ARPSTND (AQ0250) produce diagnostic reports, whereas ARPSITE (AQ0260) prints the information usually contained in the diagnostic report at the beginning and end of the site file detailed report. Additionally, ARPSITE (AQ0260) sorts the site file information so that the sites are listed in the same order as they occur in the master file.

Detailed discussions of ARPPARM (AQ0240), ARPSTND (AQ0250), and ARPSITE (AQ0260) are presented in Sections 6.2.4, 6.2.5, and 6.2.6, respectively.

ARPPARM (AQ0240) can be executed using the cataloged procedure AQRPP10, which is discussed in Section 6.2.4.5. A sample run stream to list the parameter file is shown in Section 6.2.4.5.4. ARPSTND (AQ0250) can be executed using the cataloged procedure AQRPD10, which is discussed in Section 6.2.5.5. A sample run stream to list the parameter standards file is shown in Section 6.2.5.5.4. ARPSITE (AQ0260) can be executed using the cataloged procedure AQRPS10, which is discussed in Section 6.2.6.5. A sample run stream to list the site file is shown in Section 6.2.6.5.4.



AQDHS-II MASTER FILE OR ANSWER FILE
OPTION CARD (Optional)
ARPDUMP (AQ0310) MASTER FILE FORMATTED DUMP PROGRAM
MASTER FILE FORMATTED DUMP

Figure 6.2.1-a. Master File Formatted Dump Flowchart

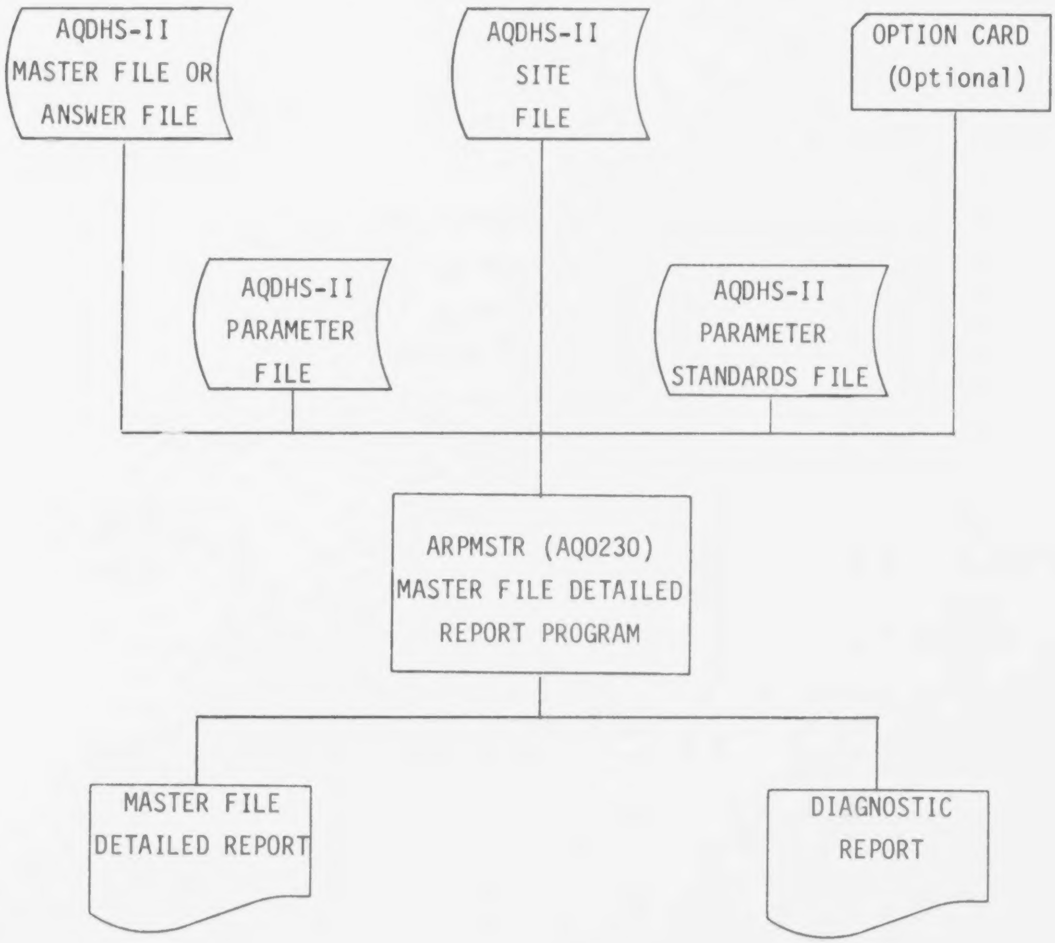


Figure 6.2.1-b. Master File Detailed Report Flowchart

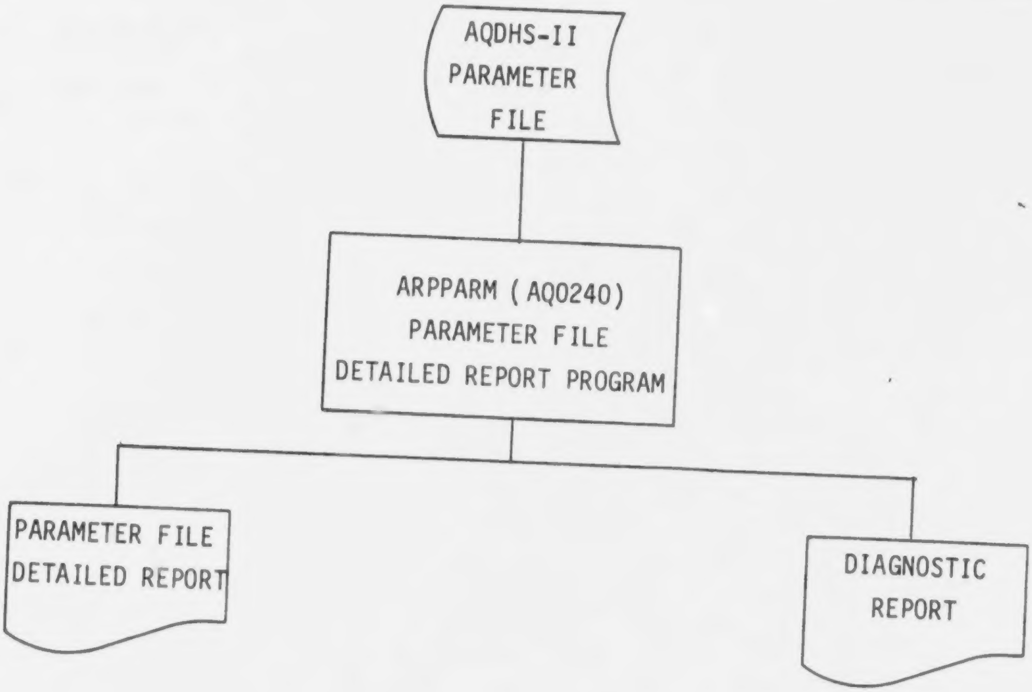


Figure 6.2.1-c. Parameter File Detailed Report Flowchart

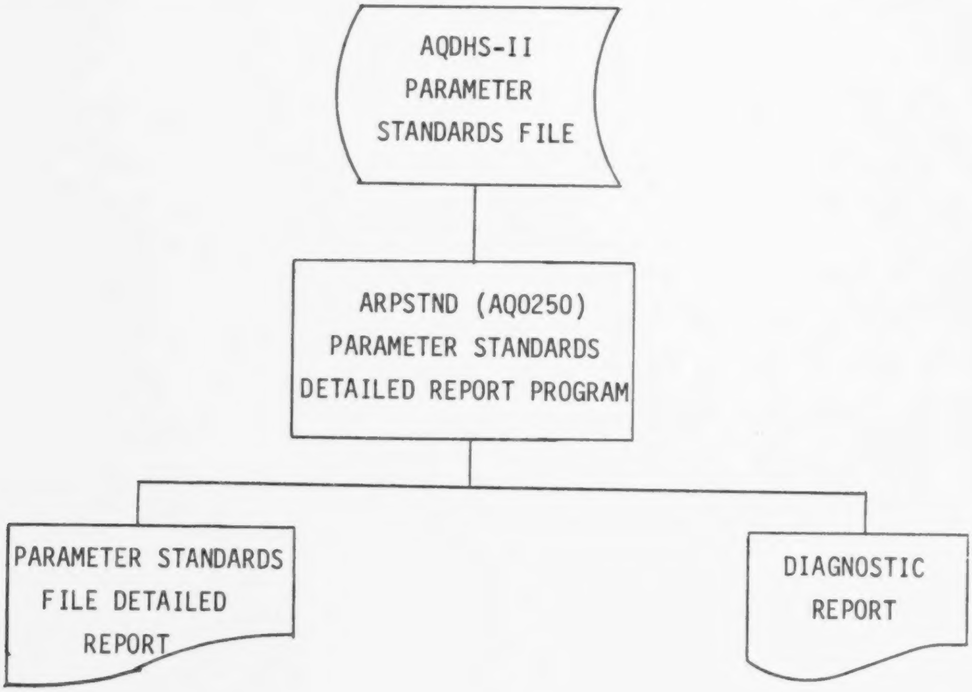


Figure 6.2.1-d. Parameter Standards File Detailed Report Flowchart

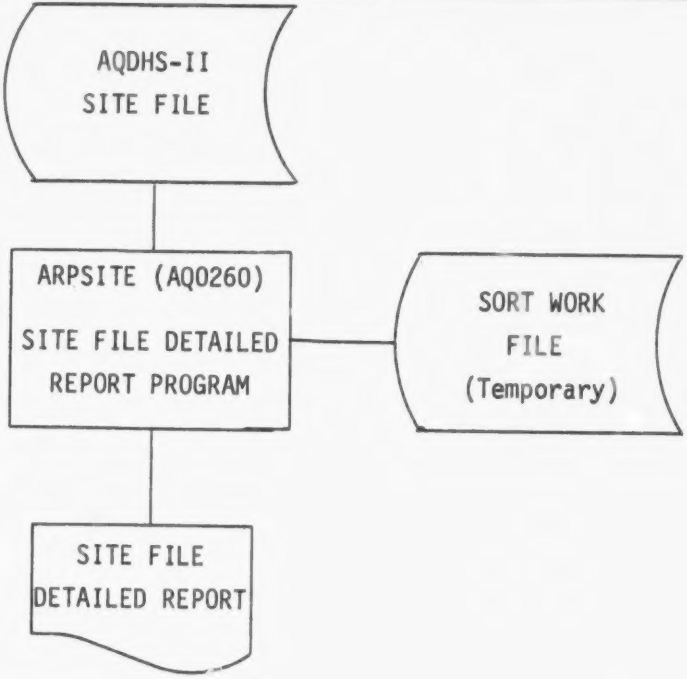


Figure 6.2.1-e. Site File Detailed Report Flowchart

6.2.2 MASTER FILE FORMATTED DUMP PROGRAM - ARPDUMP (AQ0310)

6.2.2.1 Description

ARPDUMP (AQ0310) produces a formatted dump of the AQDHS-II master file; i.e., a listing with identifying headings of all the fields in each master file record, as the records appear in the file. ARPDUMP (AQ0310) may also be used to produce a formatted dump of any AQDHS-II answer file. This formatted dump provides the user a means of verifying information contained in a master or answer file and isolating invalid data.

6.2.2.2 File Formats

Input to ARPDUMP (AQ0310) consists of an AQDHS-II master or answer file and an option card. See Figure 4.5.3-a for the format of the master file.

Output consists solely of a printed report containing the master file dump and the standard update and statistics messages. See Figure 6.2.2-a for an example of this report.

6.2.2.3 Options

The maximum number of lines per printed page can be specified by the user in card columns one and two of the option card. This option can reduce the the amount of paper used by those users who have the standard 11 x 14 output forms and the ability to print eight lines per inch. The line specification on the option card should be a number between 10 and 88. If an invalid option or no option card is entered, the default option of 55 lines per page is assumed.

See Figure 6.2.2-b for the format of the option card.

6.2.2.4 Error Messages

No error messages are printed.

6.2.2.5 Cataloged JCL

6.2.2.5.1 JCL listing - ARPDUMP (AQ0310) is executed by the cataloged procedure AQRPM25. See Figure 6.2.2-c for a listing of this procedure.

6.2.2.5.2 Cross-reference of DD names and files

Program name: ARPDUMP (AQ0310)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master or answer file	Input
AQOPTIN	Option card file	Input
AQSPRINT	Print file	Output

6.2.2.5.3 User-supplied JCL -To execute AQRPM25, the user can expect to supply job accounting information; the data set name of the input AQDHS-II master or answer file; and, optionally, an option card. See Figure 6.2.2-d for a description of the procedure's substitutable parameters.

6.2.2.5.4 Sample run stream -The following run stream would produce a dump of the master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.INMSTR'. A maximum of 80 lines per page is specified for the report.

```
// EXEC  AQRPM25,
//       MSTRFIL=INMSTR
//DUMP.OPTIONS  DD  *
80
/*
```

6.2.2.6 Warnings and Special Instructions

The maximum number of lines specified on the option card must be between 10 and 88. If an invalid option or no option card is entered, the default option of 55 lines per page is assumed.

6.2.2.7 Cost Considerations

The following estimates are for the execution of ARPDUMP (AQ0310) on an IBM 370/168:

Size of AQDHS-II master file:	13 records
CPU time:	.1 seconds
I/O time:	5.0 seconds
Total time:	5.1 seconds
Estimated cost:	$ .88

```
                                                   AQDHS-II MASTER FILE FORMATTED DUMP                                 PAGE    1
PROGRAM NAME: ARPDUMP (AQ0310)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

 OPTION OF  80  LINES PER PAGE USED
```

Figure 6.2.2-a. Master File Formatted Dump   (page 1 of 2)

```
                                        AQDHS-II MASTER FILE FORMATTED DUMP                                                  PAGE    2
ACTION C= 2  FORM C= 2  STATE #= 34  AQCR= 136  COUNTY=  1780  AREA= 0003  SITE= 002  AGENCY= G  PROJECT= 04  TIME= C  REC YEAR= 60
PARAMETER C=   43502  METHOD C= 91  UNITS C= 01  REC MONTH= 59  REC DAY= 00  START HOUR= 52  SLAMS=    NBR OF READINGS IS 01
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1  0023 **

ACTION C= 2  FORM C= 1  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 2  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 01  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 12
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 0  9000 ** S 0  9100 ** S 0  9200 ** S 0  9300 ** S 0  9400 ** S 0  9500 ** S 0  9600 ** S 0  9700 ** S 0  9800 ** S 0  9900 **
S 0  9901 ** S 0  9902 **

ACTION C= 2  FORM C= 1  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 2  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 01  REC DAY= 02  START HOUR= 00  SLAMS=    NBR OF READINGS IS 12
 U M T S A U = S   E AD N S A PEA   S F L O S   S A U - LAG B A K DEC M L C DE  B A K R A I G B A K *
S 1  9000 ** S 1  9100 ** S 1  9200 ** S 1  9300 ** S 1  9400 ** S 1  9500 ** S 1  9600 ** S 1  9700 ** S 1  9800 ** S 1  9900 **
S 1  9901 ** S 1  9902 **

ACTION C= 2  FORM C= 1  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 2  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 01  REC DAY= 03  START HOUR= 00  SLAMS=    NBR OF READINGS IS 12
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 2  9000 ** S 2  9100 ** S 2  9200 ** S 2  9300 ** S 2  9400 ** S 2  9500 ** S 2  9600 ** S 2  9700 ** S 2  9800 ** S 2  9900 **
S 2  9901 ** S 2  9902 **

ACTION C= 2  FORM C= 1  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 2  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 01  REC DAY= 04  START HOUR= 00  SLAMS=    NBR OF READINGS IS 12
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 3  9000 ** S 3  9100 ** S 3  9200 ** S 3  9300 ** S 3  9400 ** S 3  9500 ** S 3  9600 ** S 3  9700 ** S 3  9800 ** S 3  9900 **
S 3  9901 ** S 3  9902 **

ACTION C= 2  FORM C= 1  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 2  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 01  REC DAY= 05  START HOUR= 00  SLAMS=    NBR OF READINGS IS 12
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 4  9000 ** S 4  9100 ** S 4  9200 ** S 4  9300 ** S 4  9400 ** S 4  9500 ** S 4  9600 ** S 4  9700 ** S 4  9800 ** S 4  9900 **
S 4  9901 ** S 4  9902 **

ACTION C= 2  FORM C= 2  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   61202  METHOD C= 21  UNITS C= 28  REC MONTH= 02  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 02
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1  9222 ** S 4  9555 **

ACTION C= 2  FORM C= 2  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   62101  METHOD C= 20  UNITS C= 15  REC MONTH= 02  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 02
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 2  9333 ** S 0  9666 **

ACTION C= 2  FORM C= 2  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 997  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   62103  METHOD C= 20  UNITS C= 15  REC MONTH= 02  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 02
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 0  9111 ** S 3  9444 **

ACTION C= 2  FORM C= 3  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3000  SITE= 998  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   61202  METHOD C= 21  UNITS C= 28  REC MONTH= 01  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 04
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1  1111 ** S 1  1122 ** S 1  1124 ** S 1  1124 **

ACTION C= 2  FORM C= 3  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3020  SITE= 996  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   61202  METHOD C= 21  UNITS C= 28  REC MONTH= 01  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 04
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1  0511 ** S 1  0510 ** S 1  0510 ** S 1  0510 **

ACTION C= 2  FORM C= 3  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3140  SITE= 992  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   61202  METHOD C= 21  UNITS C= 28  REC MONTH= 01  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 04
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1  0000 ** S 1  0000 ** S 1 -0020 ** S 1 -0020 **

ACTION C= 2  FORM C= 3  STATE #= 37  AQCR= 186  COUNTY=  3020  AREA= 3140  SITE= 994  AGENCY= A  PROJECT= 05  TIME= 8  REC YEAR= 63
PARAMETER C=   61202  METHOD C= 21  UNITS C= 28  REC MONTH= 01  REC DAY= 01  START HOUR= 00  SLAMS=    NBR OF READINGS IS 04
SUBMIT STATUS= S  READINGS APPEAR AS FOLLOWS:  STATUS-FLAG BLANK DECIMAL-CODE  BLANK READING BLANK **
S 1 -0017 ** S 1 -0018 ** S 1 -0018 ** S 1 -0018 **

NUMBER OF RECORDS READ:          13
NUMBER OF RECORDS DUMPED:        13

PROGRAM NAME: ARPDUMP (AQ0310)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

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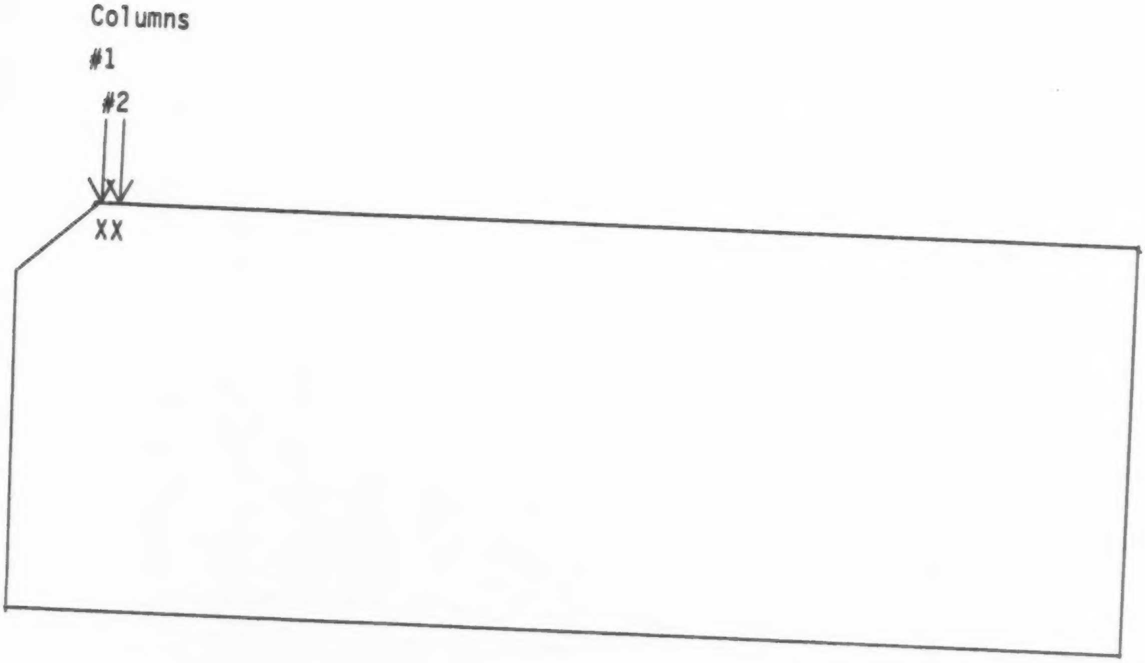
Figure 6.2.2-a - continued. Master File Formatted Dump (page 2 of 2)



XX is the maximum number of lines to be printed per page.

Figure 6.2.2-b. Format of the Option Card for ARPDUMP (AQ0310)

```
//*
//*    PROCEDURE NAME: AQRPM25
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO GENERATE A FORMATTED DUMP OF
//*    THE AQDHS-II MASTER FILE
//*
//*
//AQRPM25 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPDUMP,
//             TIME1='1,0',
//             MSTRFIL=AQMASTER,
//             OUT=A
//*
//DUMP  EXEC   PGM=&PROGRAM,
//             TIME=(&TIME1)
//*
//*  DUMP PROGRAM FOR THE AQDHS-II MASTER FILE
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             DISP=(SHR,PASS)
//*
//*   INPUT DATA SET -  AQDHS-II MASTER FILE
//*
//AQSMASTR  DD DSN=&PROJECT..DATA.&MSTRFIL,
//             DISP=(SHR,PASS)
//*
//*   INPUT DATA SET -  CONTROL CARD
//*
//AQOPTIN   DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//*   OUTPUT DATA SET - MASTER FILE DUMP
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//*   OUTPUT DATA SETS - SYSTEM OPERATIONS
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
```

Figure 6.2.2-c. Cataloged Procedure AQRPM25

Parameter Name	Default Name	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names
PROGRAM	ARPDUMP	Master file formatted dump program
TIME1	'1,0'	Time allocated for execution of ARPDUMP
MSTRFIL	AQMASTER	Lowest-level index of input master file
OUT	A	SYSOUT class for all print files

Figure 6.2.2-d. Substitutable Parameters for AQRPM25

6.2.3 MASTER FILE DETAILED REPORT PROGRAM - ARPMSTR (AQ0230)

6.2.3.1 Description

ARPMSTR (AQ0230) produces a detailed report of the AQDHS-II master (or answer) file, using information from the parameter, site, and parameter standards files for report headings. The report is organized so that the data for each parameter measured at a given site is printed on a separate page. The amount of data printed on a page is dependent on the time-code of the master file record. For hourly data, one month of data is shown on two pages, with the hours of the day as columns across and the days of the months as rows down (see Figure 6.2.3-a, pages 1 and 2); other less-than-daily data is printed one page per month (hours as columns, days as rows, (see Figure 6.2.3-a, pages 3 through 8). For daily, weekly, monthly, quarterly, and composite data, one year of data is shown per page, (see Figure 6.2.3-a, pages 9 through 13).

Both standard and sliding average value (that is, files output by the sliding average program, ASTSLAV (AQ0180)) files may be used as input to ARPMSTR (AQ0230). The formats of the sliding average reports are shown in Figure 6.2.3-b.

An option card is entered to allow the user to select two options. The first option is to determine the summary type; MEAN and SUM are the values allowed for this option. See samples of the mean reports in Figure 6.2.3-a and the sum reports in Figure 6.2.3-c. The display option allows the user to determine which values should be printed on the report. Default values are MEAN for summary and DISPLAY N > 9997 (or all non-null readings) for display. Information on the options can be found in Section 6.2.3.3.

6.2.3.2 File Formats

ARPMSTR (AQ0230) uses five input files: (1) the AQDHS-II master file (format shown in Figure 4.5.3-a), (2) the parameter file (format shown in Figure 4.2.2-c), (3) the site file (format shown in Figure 4.3.2-a), (4) the parameter standards file (format shown in Figure 4.4.2-a), and (5) an option card. See Section 6.2.3.3 for a discussion of the option card.

Two print files are output by ARPMSTR (AQ0230): a diagnostic report (shown in Figure 6.2.3-d) and the detailed report (shown in Figures 6.2.3-a, 6.2.3-b, and 6.2.3-c).

6.2.3.3 Options

The detailed report produced by ARPMSTR (AQ0230) can either be a standard or a sliding average report; however, this option is determined by the type of file entered and not by the option card. Sliding average value files output by the sliding average program, ASTSLAV (AQ0180), are flagged as such and automatically produce a sliding average report (see Figure 6.2.3-b); all other master or answer files produce a standard detailed report.

A card is input ARPMSTR (AQ0230) to allow the user to choose two options: the summary option and the display option. The summary option allows the user to specify the type of summary columns and rows to be printed; it may only be used for standard reports.

There are two summary options that can be specified: MEAN and SUM. When the MEAN option is specified, the number of readings, the maximum reading, and the mean are printed for each column and row. MEAN is the default value for the summary option; that is, if no option is specified, the MEAN option will be used. Examples of the MEAN option report are shown in Figure 6.2.3-a.

When the SUM option is specified, the number of readings and the sum of the readings are printed for each row; no column totals are printed. Examples of the SUM option report are shown in Figure 6.2.3-c.

The display option allows the user to specify a numeric criterion for readings to be printed. The criterion is specified by a statement consisting of a keyword, an optional negation flag, a relational operator, and a threshold value, in that order. Each element of the display option statement must be preceded and followed by at least one blank. The definitions of the elements of the statement are as follows:

Keyword:	DISPLAY
Negation Flag:	N or blank
Relational Operator:	>, =, or < (greater than, equal to, or less than)
Specified Value:	A number in the range -999 to 9997. (Leading zeroes in front of the decimal are not required. The decimal point should always be coded - if it is omitted, it will be assumed to be right justified in the field.)

The default value for the display option is DISPLAY N > 9997; i.e., print all readings that are not greater than 9997. When the default is in effect, all readings except 9998 and 9999 will be printed. A reading of 9998 is a special value indicating that not enough readings were present to calculate the sliding average value; asterisks, '***', will be printed wherever this value occurs (see Section 5.3.4.1). A data field containing 9999 indicates a null-value.

If no option card is included in the execution deck, the default options of MEAN and DISPLAY N > 9997 will be in effect. See Figure 6.2.3-e for the format of the option card.

6.2.3.4 Error Messages

ARPMSTR 001 ABORT - ANSWER FILE CONTAINS NO DATA

Meaning: There were no records in the input AQDHS-II master (or answer) file. It is possible that the retrieval request was overly restrictive and no records qualified. Another possibility is that the wrong file name was used in the JCL. In either case, the run was terminated and no report was produced.

Action: Examine the file names in the JCL and any retrieval specifications used; correct as necessary and resubmit the job.

ARPMSTR 002 ABORT - IDENTIFIER NOT RECOGNIZED

Meaning: The correct options were not used on the option card; the valid identifiers are DISPLAY, MEAN, and SUM. The run was terminated and no report was produced.

Action: Correct the option card and resubmit the job.

ARPMSTR 003 CONDITIONAL - OPTION CARD MISSING FOR STD ANSWER FILE - ASSUME MEAN REPORT

Meaning: No option card defining the summary type was specified. The default of MEAN was used for the report.

Action: No action is necessary, unless the SUM option is desired. If so, enter SUM on the option card and resubmit the job.

ARPMSTR 004 ABORT - SYNTAX REQUIRES RELATIONAL OP (<,=,>)

Meaning: The relational operator for the display statement is missing, improperly coded, or out of sequence on the option card. The run was terminated and no report was produced.

Action: Check the display statement for correct format and syntax. Correct the error and resubmit the job.

ARPMSTR 005 ABORT - INVALID USE OF DISPLAY STMT WITH NULL READING

Meaning: The display statement logic would have caused all valid readings to be suppressed. (An example of an invalid statement is DISPLAY N < 9999.) The run was terminated and no report was produced.

Action: Correct the display statement and resubmit the job.

ARPMSTR 006 ABORT - PARM TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input parameter file exceeds the limit of 200 imposed by the parameter table size in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 007 ABORT - SYNTAX REQUIRES NEGATIVE SYMBOL (N) OR RELATIONAL OP (<,=,>)

Meaning: Something other than the negation operator (N) or the relational operator (<,=,>) precedes the specified numeric value in the display statement. Therefore, the run was terminated.

Action: Check the display statement for correct format and syntax. Correct the error and resubmit the job.

ARPMSTR 008 ABORT - SYNTAX ERROR ON OPTION CARD

Meaning: The option card contains one or more invalid words; the only valid words are DISPLAY, SUM, and MEAN. Therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

ARPMSTR 009 ABORT - DISPLAY STMT PARAMETER NOT NUMERIC

Meaning: The threshold value used in the display statement on the option card is not a number in the range of -999 to 9997; therefore, the run was terminated.

Action: Correct the display threshold value and resubmit the job.

ARPMSTR 010 ABORT - MEAN STMT MAY NOT BE USED WITH SLIDING AVG INPUT

Meaning: The summary option is not allowed for a sliding average report; therefore, the run was terminated and no report was produced.

Action: Delete MEAN from the option card or if a sliding average file was not the expected input, check the JCL to insure that the specified master file name is correct. Resubmit the job.

ARPMSTR 011 ABORT - SUM STMT MAY NOT BE USED WITH SLIDING AVG INPUT

Meaning: The summary option is not allowed for a sliding average report; therefore, the run was terminated and no report was produced.

Action: Delete SUM from the option card or if a sliding average file was not the expected input, check the JCL to insure the master file name is correct. Resubmit the job.

ARPMSTR 012 ERROR - INTERVAL CODE CONVERSION ERROR - EXECUTION CONTINUES

Meaning: The sliding average interval (as output by ASTSLAV (AQ0180), the sliding average program) cannot be converted to a two-digit number (valid intervals are 2 - 31), and zero is substituted; however, the output report is useable.

Action: Save the input files, the run stream, the compile of ARPMSTR, and the output and contact the National Air Data Branch for assistance.

ARPMSTR 013 ABORT - OUTPUT FILE CONTAINS NO DATA

Meaning: The input file contained no records and no report was printed. One possible cause could be that the name of the master file in the JCL is incorrect. Another possible cause is that, if the report follows a retrieval, the retrieval specifications were too restrictive and no records were selected.

Action: Verify that the JCL names and/or the retrieval specifications are correct; if errors are found, correct them and resubmit the job.

ARPMSTR 014 ABORT - SITE TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input site file exceeds the limit of 200 imposed by the site table in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 015 ABORT - STANDARDS TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input standards file exceeds the limit of 200 imposed by the parameter standards table in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 016 ABORT - MEAN AND SUM ARE MUTUALLY EXCLUSIVE OPTIONS

Meaning: Both MEAN and SUM are values for the summary option and both cannot be selected for a given run; therefore, the run was terminated.

Action: Select the option desired, delete the other word from the option card, and resubmit the job.

ARPMSTR 017 ABORT - LEVEL 77 DATA FIELD "NBR OF PARMS" INCREASED BEYOND PARM-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ARPMSTR 018 ABORT - LEVEL 77 DATA FIELD "NBR-OF-SITES" INCREASED BEYOND SITE-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ARPMSTR 019 ABORT - LEVEL 77 DATA FIELD "NBR-OF-STANDARDS" INCREASED BEYOND STANDARD-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter standards table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

6.2.3.5 Cataloged JCL

6.2.3.5.1 JCL listing - Figure 6.2.3-f contains a listing of the cataloged procedure AQRPM20, which executes ARPMSTR (AQ0230).

6.2.3.5.2 Cross-reference of DD names and files

Program Name: ARPMSTR (AQ0230)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master (or answer) file	Input
AQSINPUT	Option card	Input
AQSPARMC	Parameter file	Input
AQSSITES	Site file	Input

DD Name	File Description	Input/Output
AQSTNDRD	Parameter standards file	Input
AQSPRINT	Diagnostic report	Output
AQSREPTS	Detailed report	Output

6.2.3.5.3 User-supplied JCL - To execute the cataloged procedure AQRPM20, the user must supply a job card, an option card, and names for the AQDHS-II master (or answer) file, the parameter file, the parameter standards file, and the site file. See Figure 6.2.3-g for a description of the procedure's substitutable parameters.

6.2.3.5.4 Sample run streams - Three run streams from the baseline test series are used to illustrate ARPMSTR (AQ0230). In all three, the parameter file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PARMFILE', the site file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.SITEFILE', and the parameter standards file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.STANFILE'.

The first example uses a display option of 'DISPLAY N > 50' and the default summary option MEAN. The input master file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQ1029C6'. The execution JCL for this example is:

```
//  EXEC  AQRPM20,
//        MSTRFIL=AQ1029C6
//REPORT.OPTIONS DD *
DISPLAY N > 50
/*
```

The second example uses the master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.RTANSR41'. The options are SUM and 'DISPLAY > .1'. The execution JCL for this example is:

```
//  EXEC  AQRPM20,
//        MSTRFIL=RTANSR41
//REPORT.OPTIONS DD *
SUM  DISPLAY > .1
/*
```

The third example uses a sliding average value file, 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ITSLDA45' as input. No summary option is allowed; the display option is 'DISPLAY > -10'. The execution JCL for this run is:

```
//  EXEC  AQRPM20,
//        MSTRFIL=ITSLDA45
//REPORT.OPTIONS DD *
DISPLAY > -10
/*
```

6.2.3.6 <u>Warnings and Special Instructions</u>

The report produced by ARPMSTR (AQ0230) can be very lengthy and expensive to generate. If one expects a very large report, it is recommended that the substitutable parameter for execution time be increased and the time and page limits set appropriately on the job card. At many computer installations, there is a limit set for the maximum number of pages which cannot be exceeded, even by a page limit on the job card, without special approval. See your computer systems people for information on this limit at your installation.

To reduce the size of the report (and thus the cost), it is recommended that a retrieval be run to select only those records which need to be printed. Information on retrievals can be found in Section 5.2.

The parameter, site, and parameter standards files are used to obtain information for the page headings. If no information is available on these files for a given page of the report, the heading fields involved will be printed as spaces. It is to your advantage to have the information on these auxiliary files complete and up to date so that the report will contain as much valid information as possible.

The option card is not required; the default values are MEAN and DISPLAY N > 9997. However, if an option card is entered, all information must be correct or the program execution will be terminated and no report printed.

6.2.3.7 Cost Considerations

The following statistics are from the execution of example 1 on an IBM 370/168 as shown in Section 6.2.3.5.4 and provide an estimate of the cost of executing ARPMSTR (AQ0230).

Size of input master file:	223 records
Number of detailed report pages printed:	88 pages
CPU time:	5.5 seconds
I/O time:	10.3 seconds
Total time:	15.8 seconds
Estimated cost:	$2.67

The report generated can be very lengthy, making the program expensive to run. To keep costs at a minimum, it is recommended that a retrieval be run to select only those records which need to be printed. See Section 5.2 for information on retrievals.

6.2.3.8 Related Programs and Procedures

ARPMSTR (AQ0230) can be run in conjunction with many of the other programs in the system. Section 7.0 provides examples of some of these runs including retrieval and detailed report; batched retrieval, sort and detailed report; and sliding average retrieval, sliding average program, and detailed report.

```
STATE:  OKLAHOMA (37)                          AQDHS-II AIR QUALITY DATA REPORT                                                    PAGE    40
                                                        DISPLAY N>9997

AQCR:    186       AGENCY:     EPA - ATMOSPHERIC SURVE   ANCE   COLLECTION METH:    INSTRUMENTAL
COUNTY:  3020      PROJECT:    SPECIAL STUDIES                  ANALYSIS METHOD:    PYRANOMETER                   YEAR:  1977
AREA:    2260      PARAMETER:  SOLAR RADIATION                  SAMPLING INTERVAL:  01 HOURS                      MONTH:  AUGUST
SITE:    995       UNITS:      LANGLEYS                         SAROAD KEY:         372260995A0518                MIN DET:       1
SKIATOOK LAKE, TULSA, TULSA CO.                                 KEY-1: 3718630202260995A05177 KEY-2: 633011118    UNITS CODE: 18
                                                                                                                  KEY-3: 080400

                                                     HOUR
DAY      00       01       02       03       04       05       06       07       08       09       10       11

01
02
03
04      0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.02     0.03     0.36     0.72     0.91
05      0.00     0.00     0.00     0.00     0.00     0.01     0.12     0.42     0.50     0.93     0.62     1.14
06      0.00     0.00     0.00     0.00     0.00     0.01     0.10     0.30     0.36     0.38     0.88     1.38
07      0.00     0.00     0.00     0.00     0.00     0.02     0.15     0.44     0.72     0.98     1.21     1.34
08      0.00     0.00     0.00     0.00     0.00     0.02     0.14     0.30     0.68     0.98     1.21     1.37
09      0.00     0.00     0.00     0.00     0.00     0.02     0.15     0.48     0.68     0.96     1.16     1.26
10      0.00     0.00     0.00     0.00     0.00     0.01     0.16     0.46     0.70     0.80     1.09     1.23
11      0.00     0.00     0.00     0.00     0.00     0.02     0.03     0.25     0.52     0.32     0.48     0.91
12      0.00     0.00     0.00     0.00     0.00     0.00     0.04     0.20     0.31     0.51     0.73     0.85
13      0.00     0.00     0.00     0.00     0.00     0.00     0.04              0.42     0.14     0.03     0.14
14      0.00     0.00     0.00     0.00     0.00     0.01     0.08     0.18     0.40     0.89     1.16     1.31
15      0.00     0.00     0.00     0.00     0.00     0.00     0.11     0.38     0.66     0.94
16      0.00     0.00     0.00     0.00     0.00     0.00     0.08     0.27     0.40     0.59     1.06     1.27
17      0.00     0.00     0.00     0.00     0.00     0.00     0.01     0.06     0.16     0.16     0.21     0.17
18      0.00     0.00     0.00     0.00     0.00     0.00     0.12     0.40     0.70     0.97     1.12     1.16
19      0.00     0.00     0.00     0.00     0.00     0.00     0.03     0.05     0.10     0.16     0.20     0.18
20      0.00     0.00     0.00     0.00     0.00     0.00     0.03     0.18     0.32     0.54     1.08
21      0.00     0.00     0.00     0.00     0.00     0.00     0.05     0.20     0.42     0.24     0.51     0.76
22      0.00     0.00     0.00     0.00     0.00     0.00     0.10     0.40     0.67     0.88     0.84     1.02
23      0.00     0.00     0.00     0.00     0.00     0.00     0.03     0.32     0.45     0.84     0.63     1.21
24      0.00     0.00     0.00     0.00     0.00     0.00     0.06              0.68     0.70     0.84     1.10
25      0.00     0.00     0.00     0.00     0.00     0.00     0.10     0.24     0.43     0.86     1.10     1.16
26      0.00     0.00     0.00     0.00     0.00     0.00     0.10     0.36     0.68     0.96     1.14     1.26
27      0.00     0.00     0.00     0.00     0.00     0.00     0.11     0.32     0.74     1.00     1.22     1.38
28      0.00     0.00     0.00     0.00     0.00     0.00     0.02     0.10     0.04     0.05     0.08     0.09
29      0.00     0.00     0.00     0.00     0.00     0.00     0.02     0.07     0.24     0.32     0.42     0.40
30      0.00     0.00     0.00     0.00     0.00     0.00     0.10     0.20     0.51     0.83     1.06     1.30
31      0.00     0.00     0.00     0.00     0.00     0.00     0.12     0.24     0.65     0.72     1.16     1.08

NO        28       28       28       28       28       28       28       26       28       28       27       26

MEAN      .0       .0       .0       .0       .0    .0042    .0785     .263    .4703    .6432    .8133    .9761

MAX     0.00     0.00     0.00     0.00     0.00     0.02     0.16     0.48     0.74     1.00     1.22     1.38
```

Figure 6.2.3-a. Mean Report

(page 1 of 13)

```
STATE:  OKLAHOMA (37)
                                        AQDHS-II AIR QUALITY DATA REPORT
                                                DISPLAY N>9997                                                  PAGE    41
AQCR:    186      AGENCY:    EPA - ATMOSPHERIC SURVEILLANCE    COLLECTION METH:    INSTRUMENTAL
COUNTY:  3020     PROJECT:   SPECIAL STUDIES                   ANALYSIS METHOD:    PYRANOMETER              YEAR:   1977
AREA:    2260     PARAMETER: SOLAR RADIATION                   SAMPLING INTERVAL:  01 HOURS                 MONTH:  AUGUST
SITE:    995      UNITS:     LANGLEYS                          SAROAD KEY:         372260995A0518           MIN DET:       1
SKIATOOK LAKE, TULSA, TULSA CO.                                KEY-1: 37186302022260995A05177 KEY-2: 633011118 UNITS CODE: 18
                                                                                                          KEY-3: 080400
                                          HOUR
DAY     12      13      14      15      16      17      18      19      20      21      22      23   NO.    MEAN    MAX

01                                                                                                    0
02                                                                                                    0
03                                                                                                    0
04    0.78    0.86    1.08    0.72            0.36    0.10    0.01    0.00    0.00    0.00    0.00   23   .2586   1.08
05    1.02    0.66    0.74    0.44    0.46    0.21    0.08    0.04    0.00    0.00    0.00    0.00   24   .3079   1.14
06    1.30    0.96    0.48    0.52    0.70    0.30    0.12    0.01    0.00    0.00    0.00    0.00   24   .3283   1.38
07    1.43    1.36    1.16    0.97    0.66    0.38    0.10    0.02    0.00    0.00    0.00    0.00   24   .4558   1.43
08    1.44    1.42    1.22    0.92    0.70    0.39    0.11    0.01    0.00    0.00    0.00    0.00   24   .4545   1.44
09    1.31    1.33    1.08    0.93    0.72    0.39    0.11    0.00    0.00    0.00    0.00    0.00   24   .4408   1.33
10    1.19    1.41    1.23    0.73    0.21    0.28    0.07    0.01    0.00    0.00    0.00    0.00   24   .3991   1.41
11    0.63    0.52    0.59    0.32    0.23    0.13    0.03    0.01    0.00    0.00    0.00    0.00   24   .2079   0.91
12    0.54    0.44    0.35    0.40    0.29    0.16    0.05    0.00    0.00    0.00    0.00    0.00   24   .2029   0.85
13    0.05    0.18    0.42    0.54    0.42    0.33    0.08    0.02    0.00    0.00    0.00    0.00   24   .1221   0.54
14    1.30    0.64    1.11    0.53    0.02    0.00    0.02    0.00    0.00    0.00    0.00    0.00   23   .3187   1.31
15    1.33    1.30    1.15    0.93    0.64    0.35    0.08    0.01    0.00    0.00    0.00    0.00   24   .3581   1.33
16    1.23    1.08    0.89    0.74    0.62    0.10    0.03    0.00    0.00    0.00    0.00    0.00   22   .3483   1.27
17    0.22    0.35    0.52    0.40    0.20    0.30    0.12    0.01    0.00    0.00    0.00    0.00   24   .1204   0.52
18    1.16    0.52    0.28    0.31    0.19    0.12    0.03    0.01    0.00    0.00    0.00    0.00   24   .2954   1.16
19    0.40    0.40            0.20    0.10    0.03    0.00    0.00    0.00    0.00    0.00    0.00   24   .0804   0.40
20    1.30    1.16    0.90    0.84    0.58    0.30    0.08    0.01    0.00    0.00    0.00    0.00   24   .3217   1.38
21    0.76    1.16    1.10    0.93    0.59    0.33    0.08    0.01    0.00    0.00    0.00    0.00   23   .2975   1.16
22    0.98    1.08    1.08    0.90    0.52    0.31    0.13    0.02    0.00    0.00    0.00    0.00   23    .372   1.08
23    1.33    1.24    1.12    0.76    0.58    0.38    0.12    0.02    0.00    0.00    0.00    0.00   24   .3762   1.33
24    1.03    0.92    0.84    0.70    0.58    0.38    0.06    0.00    0.00    0.00    0.00    0.00   24    .343   1.10
25    0.98    1.00    1.02    0.88    0.61    0.30    0.07    0.02    0.00    0.00    0.00    0.00   24   .3654   1.16
26    1.24    1.12    1.08    0.84    0.61    0.24    0.07    0.00    0.00    0.00    0.00    0.00   24   .4041   1.26
27    1.41    1.30    1.14    0.90    0.66    0.28    0.06    0.00    0.00    0.00    0.00    0.00   23   .4383   1.41
28    0.18    0.18    0.30    0.14    0.12    0.06    0.02    0.00    0.00    0.00    0.00    0.00   24   .0575   0.30
29    0.80    0.84    0.62    0.78    0.56    0.20    0.08    0.00    0.00    0.00    0.00    0.00   24   .2229   0.84
30    1.24    1.18    1.04    0.84    0.52    0.28    0.07    0.00    0.00    0.00    0.00    0.00   24    .382   1.30
31    1.22    1.12    1.02    0.82    0.58    0.28    0.05    0.00    0.00    0.00    0.00    0.00   24   .3775   1.22

NO      28      28      27      28      27      28      28      28      28      28      28      28  665

MEAN .9957   .9189   .8725    .676   .4692   .2589   .0721   .0085      .0      .0      .0      .0
                                                                                                         .3097
MAX   1.44    1.42    1.23    0.97    0.72    0.39    0.13    0.04    0.00    0.00    0.00    0.00
                                                                                                                  1.44
```

Figure 6.2.3-a - continued. Mean Report (page 2 of 13)

```
STATE:  NORTH CAROLINA (34)
                                              AQDHS-II AIR QUALITY DATA REPORT
                                                       DISPLAY N>9997                                                          PAGE    21
AQCR:   169       AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE
COUNTY: 0960      PROJECT:    EPISODE MONITORING              COLLECTION METH:      TAPE SAMPLER
AREA:   0001      PARAMETER:  SOILING INDEX (COH/1000LF)      ANALYSIS METHOD:      TRANSMITTANCE              YEAR:  1974
SITE:   001       UNITS:      COHS/1000 LINEAR FEET           SAMPLING INTERVAL:    02 HOURS                   MONTH:  FEBRUARY
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                      SAROAD KEY:           340001001A0616             MIN DET:     .01
                                                              KEY-1: 341690960000001001A06274 KEY-2: 112018109 UNITS CODE: 09
                                                                                                               KEY-3: 020101
                                                    HOUR
DAY     01      03      05      07      09      11      13      15      17      19      21      23     NO.    MEAN     MAX

01      0.1     0.1     0.2     0.3     0.5     0.8     0.3     2.1                                     8     .55     2.1
02                                                                                                      0
03                                                                                                      0
04      0.2     0.2     0.4     0.6     1.0     1.6     2.6     4.2                                     8    1.35     4.2
05                                                                                                      0
06                                                                                                      0
07                                                                                                      0
08      0.5     0.5     1.0     1.5     2.5     4.0     1.5     0.5                                     8    1.5      4.0
09                                                                                                      0
10                                                                                                      0
11                                                                                                      0
12      0.8     0.8     1.6     2.4     4.0     1.4     0.4     1.8                                     8    1.65     4.0
13                                                                                                      0
14                                                                                                      0
15                                                                                                      0
16                                                                                                      0
17                                                                                                      0
18      2.1     2.1     4.2     1.3     0.5     1.8     2.3     4.1                                     8    2.3      4.2
19                                                                                                      0
20                                                                                                      0
21                                                                                                      0
22                                                                                                      0
23                                                                                                      0
24                                                                                                      0
25                                                                                                      0
26                                                                                                      0
27                                                                                                      0
28      3.7     3.7     2.8     1.7     4.5     1.2     0.7     1.9                                     8    2.525    4.5

NO        6       6       6       6       6       6       6       6       0       0       0       0    48
MEAN    1.233   1.233   1.7     1.3     2.167   1.8     1.3     2.433                                        1.646
MAX     3.7     3.7     4.2     2.4     4.5     4.0     2.6     4.2                                                   4.5
```

Figure 6.2.3-a - continued. Mean Report (page 3 of 13)

```
STATE:  NORTH CAROLINA (34)                      AQDHS-II AIR QUALITY DATA REPORT                                                    PAGE    22
                                                          DISPLAY N>9997
AQCR:    169      AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:    BUCKET; JAR
COUNTY: 0960      PROJECT:    EPISODE MONITORING               ANALYSIS METHOD:    GRAVIMETRIC (APCA)            YEAR:  1974
AREA:   0001      PARAMETER:  TOTAL SETTLED PARTICULATE        SAMPLING INTERVAL:  03 HOURS                      MONTH:  MARCH
SITE:    001      UNITS:      TONS/SQUARE MILE-MONTH           SAROAD KEY:         340001001A0616                MIN DET:    1.43
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                       KEY-1: 34169096000O1001A06374 KEY-2: 211017190 KEY-3: 030102
                                                                                                                 UNITS CODE: 90

                                      HOUR
DAY      02       05       08       11       14       17       20       23     NO.    MEAN     MAX

01      0.01     0.01     0.02     0.03     0.05     0.08     0.03     0.21     8     .055    0.21
02                                                                              0
03      0.01    -0.01     0.02     0.03     0.05     0.08     0.03     0.21     8     .055    0.21
04                                                                              0
05                                                                              0
06      0.02     0.02     0.04     0.06     0.10     0.16     0.26     0.42     8     .135    0.42
07                                                                              0
08                                                                              0
09                                                                              0
10      0.03     0.03     0.06     0.09     0.15     0.24     0.39     0.13     8     .14     0.39
11                                                                              0
12      0.05     0.05     0.10     0.15     0.25     0.40     0.15     0.05     8     .15     0.40
13      0.08     0.08     0.16     0.24     0.40     0.14     0.04     0.18     8     .165    0.40
14      0.13     0.13     0.26     0.39     0.15     0.04     0.19     0.23     8     .19     0.39
15      0.21     0.21     0.42     0.13     0.05     0.18     0.23     0.41     8     .23     0.42
16                                                                              0
17                                                                              0
18      0.33     0.33     0.18     0.02     0.20     0.22     0.42     0.14     8     .23     0.42
19                                                                              0
20                                                                              0
21                                                                              0
22      0.04     0.04     0.10     0.15     0.25     0.40     0.15     0.05     8    .1475    0.40
23      0.37     0.37     0.28     0.17     0.45     0.12     0.07     0.19     8    .2525    0.45
24                                                                              0
25                                                                              0
26      0.41     0.41     0.38     0.32     0.20     0.02     0.22     0.24     8     .275    0.41

NO        12       12       12       12       12       12       12       12    96

MEAN   .1408    .1408    .1683    .1483    .1916    .1733    .1816    .205          .1687

MAX     0.41     0.41     0.42     0.39     0.45     0.40     0.42     0.42                   0.45
```

Figure 6.2.3-a - continued. Mean Report

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STATE:  NORTH CAROLINA (34)                    AQDHS-II AIR QUALITY DATA REPORT                                              PAGE    23
                                                        DISPLAY N>9997

AQCR:    169      AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:    INSTRUMENTAL
COUNTY: 0960      PROJECT:    EPISODE MONITORING               ANALYSIS METHOD:    NONDISPERSIVE INFRA-RED      YEAR:  1974
AREA:    0001     PARAMETER: CARBON MONOXIDE                   SAMPLING INTERVAL: 04 HOURS                      MONTH:  APRIL
SITE:    001      UNITS:      M-GMS/M3 (25DEG C,1013 M-BARS)   SAROAD KEY:         340001001A0616               MIN DET:    .575
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                       KEY-1: 34169096000001001A06474 KEY-2: 421011105  UNITS CODE: 05
                                           PRIMARY                                                              KEY-3: 040103
FEDERAL STANDARD  10,000 UG/M3 (0 C)    8 HR. MAX, 1 PER YR.                       SECONDARY
STATE STANDARD    10,000 UG/M3 (25 C), 8 HR. MAX, 1 PER YR.         10,000 UG/M3 (0 C)  8 HR. MAX, 1 PER YR.
                                                                    10,000 UG/M3 (25 C) 8 HR. MAX, 1 PER YR.

                            HOUR

DAY      03        07        11        15        19        23      NO.    MEAN      MAX

01     0.001     0.001     0.002     0.003     0.005     0.008      6    .0033    0.008
02     0.001     0.001     0.002     0.003     0.005     0.008      6    .0033    0.008
03     0.002     0.002     0.004     0.006     0.010     0.016      6    .0066    0.016
04     0.003     0.003     0.006     0.009     0.015     0.024      6      .01    0.024
05                                                                  0
06                                                                  0
07                                                                  0
08     0.005     0.005     0.010     0.015     0.025     0.040      6    .0166    0.040
09                                                                  0
10     0.008     0.008     0.016     0.024     0.040     0.014      6    .0183    0.040
11                                                                  0
12                                                                  0
13                                                                  0
14                                                                  0
15                                                                  0
16                                                                  0
17                                                                  0
18     0.013     0.013     0.026     0.039     0.015     0.004      6    .0183    0.039
19     0.021     0.021     0.042     0.013     0.005     0.018      6      .02    0.042
20     0.033     0.033     0.018     0.002     0.020     0.022      6    .0213    0.033
21                                                                  0
22                                                                  0
23     0.004     0.004     0.010     0.015     0.025     0.040      6    .0163    0.040
24                                                                  0
25                                                                  0
26     0.037     0.037     0.028     0.017     0.045     0.012      6    .0293    0.045
27     0.041     0.041     0.038     0.032     0.020     0.002      6     .029    0.041

NO        12        12        12        12        12        12     72

MEAN    .014      .014     .0168     .0148     .0191     .0173           .0160

MAX    0.041     0.041     0.042     0.039     0.045     0.040                     0.045
```

Figure 6.2.3-a - continued. Mean Report

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STATE:  NORTH CAROLINA (34)
                                                  AQDHS-II AIR QUALITY DATA REPORT
                                                         DISPLAY N>9997                                                          PAGE    24
AQCR:    169       AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:    GAS BUBBLER
COUNTY: 0960       PROJECT:    EPISUDE MONITORING               ANALYSIS METHOD:    PHENOLPHTHALEIN              YEAR:  1974
AREA:   0001       PARAMETER:  CARBON DIOXIDE                   SAMPLING INTERVAL:  06 HOURS                     MONTH:  MAY
SITE:   001        UNITS:      M-GMS/M3 (25DEG C,1013 M-BARS)   SAROAD KEY:         340001001A0616               MIN DET:     1.8
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                        KEY-1: 34169096000001001A06574 KEY-2: 421029105  UNITS CODE: 05
                                                                                                                 KEY-3: 050104
                HOUR
DAY      04       10       16       22     NO.    MEAN     MAX

01     .0001    .0001    .0002    .0003     4    .0001    .0003
02                                          0
03                                          0
04                                          0
05                                          0
06                                          0
07                                          0
08                                          0
09                                          0
10                                          0
11     .0001    .0001    .0002    .0003     4    .0001    .0003
12     .0002    .0002    .0004    .0006     4    .0003    .0006
13     .0003    .0003    .0006    .0009     4    .0005    .0009
14     .0005    .0005    .0010    .0015     4    .0008    .0015
15                                          0
16                                          0
17                                          0
18                                          0
19     .0008    .0008    .0016    .0024     4    .0014    .0024
20     .0013    .0013    .0026    .0039     4    .0022    .0039
21     .0021    .0021    .0042    .0013     4    .0024    .0042
22     .0033    .0033    .0018    .0002     4    .0021    .0033
23     .0004    .0004    .0010    .0015     4    .0008    .0015
24                                          0
25                                          0
26                                          0
27     .0037    .0037    .0028    .0017     4    .0029    .0037
28                                          0
29                                          0
30     .0041    .0041    .0038    .0032     4    .0038    .0041

NO       12       12       12       12     48

MEAN   .0014    .0014    .0016    .0014          .0014

MAX    .0041    .0041    .0042    .0039                   .0042
```

Figure 6.2.3-a - continued. Mean Report

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STATE:  NORTH CAROLINA (34)                        AQDHS-II AIR QUALITY DATA REPORT                                                  PAGE    25
                                                              DISPLAY N>9997

AQCR:    169      AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:    DAVIS INSTRUMENT               YEAR:  1974
COUNTY:  0960     PROJECT:    EPISODE MONITORING               ANALYSIS METHOD:    SEQUENTIAL-CONDUCTOMETRIC      MONTH:  JUNE
AREA:    0001     PARAMETER:  SULFUR DIOXIDE                   SAMPLING INTERVAL:  08 HOURS                       MIN DET:    28.6
SITE:    001      UNITS:      U-GMS/M3 (0DEG C, 1013 M-BARS)   SAROAD KEY:         340001001A0616                 UNITS CODE: 02
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                       KEY-1: 341690960000 1001A06674 KEY-2: 424013302 KEY-3: 060105
                                        PRIMARY                                               SECONDARY
FEDERAL STANDARD      365 UG/M3 (25 C)  24 HOUR MAXIMUM, 1 PER YEAR        1300 UG/M3 (0 C), 3 HR. MAX.,1 PER YR
STATE STANDARD         60 UG/M3 (25 C)  ANNUAL ARITHMETIC MEAN             0.4 PARTS/MILLION,  3 HR.MAX, 1 PER YEAR

              HOUR

DAY      05        13        21      NO.     MEAN      MAX

01       0.1       0.1       0.2      3     .1333      0.2
02       0.1       0.1       0.2      3     .1333      0.2
03       0.2       0.2       0.4      3     .2666      0.4
04       0.3       0.3       0.6      3        .4      0.6
05       0.5       0.5       1.0      3     .6666      1.0
06       0.8       0.8       1.6      3     1.067      1.6
07       1.3       1.3       2.6      3     1.733      2.6
08       2.1       2.1       4.2      3       2.8      4.2
09                                    0
10                                    0
11                                    0
12                                    0
13                                    0
14                                    0
15                                    0
16                                    0
17                                    0
18                                    0
19                                    0
20                                    0
21                                    0
22                                    0
23                                    0
24       3.3       3.3       1.8      3       2.8      3.3
25                                    0
26       0.4       0.4       1.0      3        .6      1.0
27                                    0
28       3.7       3.7       2.8      3       3.4      3.7
29                                    0
30       4.1       4.1       3.8      3        4.      4.1

NO        12        12        12     36

MEAN   1.408     1.408     1.683            1.500

MAX      4.1       4.1       4.2                       4.2
```

Figure 6.2.3-a - continued. Mean Report

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STATE:  NORTH CAROLINA (34)
                                              AQDHS-II AIR QUALITY DATA REPORT
                                                       DISPLAY N>9997                                                          PAGE     26
AQCR:    169       AGENCY:      EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:     GAS BUBBLER
COUNTY: 0960       PROJECT:     EPISODE MONITORING               ANALYSIS METHOD:     SALTZMAN(100ML TU+URIFIC)    YEAR:  1974
AREA:    0001      PARAMETER:  NITROGEN DIOXIDE                  SAMPLING INTERVAL:  12 HOURS                       MONTH:   JULY
SITE:    001       UNITS:       PARTS PER MILLION (VOL/VOL)      SAROAD KEY:          340001001A0616                MIN DET:   .0027
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                         KEY-1: 3416909600001001A06774 KEY-2: 426028207     UNITS CODE: 07
                                        PRIMARY                                                                      KEY-3: 070106
FEDERAL STANDARD      0.05 PARTS/MILLION, ANNUAL ARITHMETIC MEAN                   SECONDARY
STATE STANDARD        0.03 PARTS/MILLION, ANNUAL ARITHMETIC MEAN        0.05 PARTS/MILLION, ANNUAL ARITHMETIC MEAN
                                                                         0.03 PARTS/MILLION, ANNUAL ARITHMETIC MEAN

          HOUR

DAY      06        18      NO.     MEAN      MAX

01      0.01      0.01      2      .01      0.01
02                          0
03      0.01      0.01      2      .01      0.01
04                          0
05      0.02      0.02      2      .02      0.02
06                          0
07      0.03      0.03      2      .03      0.03
08                          0
09                          0
10                          0
11                          0
12                          0
13                          0
14      0.05      0.05      2      .05      0.05
15                          0
16                          0
17                          0
18                          0
19                          0
20      0.08      0.08      2      .08      0.08
21                          0
22      0.13      0.13      2      .13      0.13
23                          0
24      0.21      0.21      2      .21      0.21
25                          0
26      0.33      0.33      2      .33      0.33
27                          0
28      0.04      0.04      2      .04      0.04
29                          0
30      0.37      0.37      2      .37      0.37
31      0.41      0.41      2      .41      0.41

NO       12        12      24

MEAN   .1408     .1408             .1408

MAX     0.41      0.41                      0.41
```

Figure 6.2.3-a - continued. Mean Report

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STATE:  OKLAHOMA (37)                      AQDHS-II AIR QUALITY DATA REPORT                                   PAGE    39
                                                   DISPLAY N>9997

AUCR:    184      AGENCY:     STATE                             COLLECTION METH:    HI-VOL                    YEAR:  1971
COUNTY:  0600     PROJECT:    SPECIAL STUDIES                   ANALYSIS METHOD:    GRAVIMETRIC
AREA:    0001     PARAMETER:  TOTAL SUSPENDED PARTICULATE       SAMPLING INTERVAL:  DAILY                     MIN DET:      1
SITE:    234      UNITS:      U-GMS/M3 (25DEG C,1013 M-BARS)    SAROAD KEY:         370001234F0518            UNITS CODE: 01
MCALISTER RD., NORMAN, CLEVELAND CO.                            KEY-1: 3718406000001234F05871 KEY-2: 111019101 KEY-3: 010100
                                   PRIMARY                                                SECONDARY
FEDERAL STANDARD      75 UG/M3 (25 C) ANNUAL GEOMETRIC MEAN                 60 UG/M3 (25 C) ANNUAL GEOMETRIC MEAN
STATE STANDARD       250 UG/M3 (25 C) 24 HOUR MAXIMUM, 1 PER YEAR          120 UG/M3 (25 C) 24 HOUR MAXIMUM,1 PER YEAR


                                             MONTH

DAY       JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC   NO.     MEAN    MAX

01                101              60                                                                     2     80.5    101
02                                                                          56      17      35      25    4    33.25     56
03                 60                                              44                                     2      52.     60
04                                        168                               50              34            3      84.    168
05                                 70              54      90      46              70                     5      66.     90
06                                177                                                       37            2     107.    177
07                                                         62      31      57      52              15     5     43.4     62
08                                 38      38                                                             2      38.     38
09                         51                              59              59      54      38             5     52.2     59
10                                                                 72                                     1      72.     72
11                 40                      76                                                             2      58.     76
12                                                                 39              43                     2      41.     43
13                                                                                                        0
14         66                              42      37              22      74      50              25     7    45.14     74
15                 99                                                                                     1      99.     99
16                         80      83                                      44      20                     4    56.75     83
17                         62              77              77      89                                     4    76.25     89
18         67      51                              52                       7                             4    44.25     67
19                                                                 95              11                     2      53.     95
20                                                         89                                             1      89.     89
21         40                              48      71              56      34      35                     6    47.33     71
22                                                         31                                             1      31.     31
23                         63      51                                      35      37                     4     46.5     63
24                                         73              30      48                                     3    50.33     73
25         45                                                              19                             2      32.     45
26                         70                      68              63              37                     4     59.5     70
27                                 40                      52                                             2      46.     52
28         52                             113                      66      34      23                     5     57.6    113
29                                                 45      38                                             2     41.5     45
30                        103                                              39      32      24             4     49.5    103
31                                                         57      87                                     2      72.     87

NO          5       5       6       7       8       6      10      13      12      13       5       3    93

MEAN      54.    70.2    71.5   74.14   79.38    54.5    58.5   58.31   42.33     37.    33.6   21.67          54.80

MAX        67     101     103     177     168      71      90      95      74      70      38      25                   177
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Figure 6.2.3-a - continued. Mean Report

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STATE:  OKLAHOMA (37)                        AQDHS-II AIR QUALITY DATA REPORT                                    PAGE    59
                                                    DISPLAY N>9997

AQCR:    186      AGENCY:    EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:    INSTRUMENTAL               YEAR:  1965
COUNTY:  3020     PROJECT:   SPECIAL STUDIES                  ANALYSIS METHOD:    ELEC. / MACH. AVG. L2-L1
AREA:    3020     PARAMETER: LAPSE RATE                       SAMPLING INTERVAL: WEEKLY                     MIN DET:  -99.0
SITE:    996      UNITS:     DEG. CENTIGRADE/100 M            SARUAD KEY:         373020996A0518             UNITS CODE: 28
SPERRY, TULSA, TULSA CO.                                      KEY-1: 3718630203020996A05965 KEY-2: 612022128 KEY-3: 020200

                                                MONTH

WEEK   JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC    NO.    MEAN     MAX

01             .0500                                                                                   1      .05   .0500
02               500                                                                                   1     500.     500
03              50.0                                                                                   1      50.    50.0
04             0.500                                                                                   1       .5   0.500
05             .0500                                                                                   1      .05   .0500

NO       0         5      0       0       0       0       0       0       0       0       0       0      5

MEAN           110.1                                                                                        110.1

MAX              500                                                                                                  500
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Figure 6.2.3-a - continued. Mean Report

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STATE:  NORTH CAROLINA (34)                    AQDHS-II AIR QUALITY DATA REPORT                                           PAGE     33
                                                         DISPLAY N>9997

AQCR:    170       AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:   GAS BUBBLER                      YEAR:  1973
COUNTY: 2980       PROJECT:    EPISODE MONITORING                ANALYSIS METHOD:   SALTZMAN METHOD
AREA:    0001      PARAMETER: OXIDES OF NITROGEN                 SAMPLING INTERVAL: MONTHLY                         MIN DET:  .0027
SITE:    004       UNITS:      PARTS PER MILLION (VOL/VOL)       SAROAD KEY:        340001004A0617                  UNITS CODE: 07
GUM BRANCH RD., JACKSONVILLE, ONSLOW CO.                         KEY-1: 3417029800001004A06A73 KEY-2: 426039907 KEY-3: 010100

                                                  MONTH

SITE   JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC    NO.   MEAN    MAX

004   .0026   .0025   .0999   .0023   .0022   .0021   .0999   .0023   .0024   .0025   .0026   .0025   12   .0186   .0999
```

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Figure 6.2.3-a - continued. Mean Report

```
STATE:  NORTH CAROLINA (34)                      AQDHS-II AIR QUALITY DATA REPORT                                                    PAGE    19
                                                               DISPLAY N>9997
AQCR:    166      AGENCY:     EPA - ATMOSPHERIC SURVEILLANCE   COLLECTION METH:     GAS BUBBLER                    YEAR:  1972
COUNTY: 2120      PROJECT:    EPISODE MONITORING               ANALYSIS METHOD:     PARAROSANILINE
AREA:    0001     PARAMETER: ALDEHYDE                          SAMPLING INTERVAL: QUARTERLY                        MIN DET:     5.5
SITE:    002      UNITS:      U-GMS/M3 (0DEG C, 1013 M-BARS)   SAROAD KEY:          340001002A0616                 UNITS CODE: 02
HWY. 301 BUS., SMITHFIELD, JOHNSTON CO.                        KEY-1: 3416621200001002A06872 KEY-2: 435019202 KEY-3: 010100

                QUARTER

SITE    1ST     2ND     3RD     4TH    NO.    MEAN    MAX

002     11.9    12.8    13.2    10.1     4     12.    13.2
```

Figure 6.2.3-a - continued. Mean Report

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```
STATE:  NORTH CAROLINA (34)                    AQDHS-II AIR QUALITY DATA REPORT                                      PAGE      6
                                                         DISPLAY N>9997

AQCR:    136      AGENCY:     COUNTY                          COLLECTION METH:      GAS BUBBLER                YEAR:  1960
COUNTY: 1780      PROJECT:    COMPLAINT INVESTIGATION         ANALYSIS METHOD:      CHROMATROPIC ACID
AREA:    0003     PARAMETER:  FORMALDEHYDE                    SAMPLING INTERVAL:    COMPOSITE
SITE:    002      UNITS:      U-GMS/M3 (25DEG C,1013 M-BARS)  SAROAD KEY:           340003002G0413             MIN DET:      .5
HEIDSVILLE HWY., GREENSBORO, GUILFORD CO.                     KEY-1: 34136178000003002G04C60 KEY-2: 435029101 KEY-3: 590052
                                                                                                                 UNITS CODE: 01

COMPOSITE TYPE:  ANNUAL

PD    RDING    SAMPLES  TIME-CODE

00      2.3    52           9

NU        1

MEAN    2.3

MAX     2.3
```

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Figure 6.2.3-a - continued. Mean Report

```
STATE: HAWAII (12)                          AQDHS-II AIR QUALITY DATA REPORT - SLIDING AVERAGE INTERVAL =  3                   PAGE     3
                                                                       DISPLAY  >0.5
AQCR:   060       AGENCY:     EPA - EFFECTS RESEARCH
COUNTY: 0140      PROJECT:    POPULATION-ORIENTED SURV.          COLLECTION METH:     INSTRUMENTAL                       YEAR:  1973
AREA:   0001      PARAMETER:  WIND DIRECTION                     ANALYSIS METHOD:     ELEC. OR MACHINE AVERAGE           MONTH:   SEPTEMBER
SITE:   003       UNITS:      DEGREES (COMPASS)                  SAMPLING INTERVAL:   01 HOURS                           MIN DET:     1.0
WAIKIKI, HONOLULU, HONOLULU CO.                                  SAROAD KEY:          120001003C0106                     UNITS CODE: 14
                                                                 KEY-1: 1206001400001003C01173 KEY-2: 611025014 KEY-3: 091200

                                                     HOUR
DAY      00        01        02        03        04        05        06        07        08        09        10        11

01
02
03
04
05
06
07
08
09
10
11
12      ***      5.500     5.000     4.333     3.333     2.667     3.333     3.333     3.667     3.333     3.333     3.667

*** INDICATES SLIDING AVERAGE VALUE NOT COMPUTED DUE TO INSUFFICIENT NUMBER OF READINGS IN FILE.
BLANK INDICATES SLIDING AVERAGE VALUE DID NOT MEET DISPLAY CRITERIA OR DID NOT MEET SELECTION CRITERIA.
```

Figure 6.2.3-b. Sliding Average Report (page 1 of 2)

```
STATE:  HAWAII (12)
                                AQDHS-II AIR QUALITY DATA REPORT - SLIDING AVERAGE INTERVAL =  3
                                                     DISPLAY  >0.5                                          PAGE     4
AQCR:    060      AGENCY:     EPA - EFFECTS RESEARCH
COUNTY:  0140     PROJECT:    POPULATION-ORIENTED SURV.       COLLECTION METH:    INSTRUMENTAL
AREA:    0001     PARAMETER:  WIND DIRECTION                  ANALYSIS METHOD:    ELEC. OR MACHINE AVERAGE      YEAR:  1973
SITE:    003      UNITS:      DEGREES (COMPASS)               SAMPLING INTERVAL:  01 HOURS                      MONTH:  SEPTEMBER
WAIKIKI, HONOLULU, HONOLULU CO.                               SAROAD KEY:         120001003C0106                MIN DET:     1.0
                                                              KEY-1: 120600140000100 3C01173 KEY-2: 611025014 KEY-3: 091200

                                                   HOUR
DAY     12       13       14       15       16       17       18       19       20       21       22       23

01
02
03
04
05
06
07
08
09
10
11
12    3.333    3.333    3.000    2.667    2.667    2.333    3.000    3.000    3.333    2.667    3.000    3.000

*** INDICATES SLIDING AVERAGE VALUE NOT COMPUTED DUE TO INSUFFICIENT NUMBER OF READINGS IN FILE.
BLANK INDICATES SLIDING AVERAGE VALUE DID NOT MEET DISPLAY CRITERIA OR DID NOT MEET SELECTION CRITERIA.
```

Figure 6.2.3-b - continued. Sliding Average Report   (page 2 of 2)

```
STATE:  NORTH CAROLINA (34)
                                            AQDHS-II AIR QUALITY DATA REPORT
                                                    DISPLAY  >-10                                                   PAGE     1
AQCR:    169       AGENCY:    EPA - ATMOSPHERIC SURVEILLANCE    COLLECTION METH:
COUNTY: 0960       PROJECT:   EPISODE MONITORING                ANALYSIS METHOD:                          YEAR:  1979
AREA:    0001      PARAMETER:                                   SAMPLING INTERVAL: 12 HOURS               MONTH:  FEBRUARY
SITE:    001       UNITS:                                       SAROAD KEY:          340001001A0616       MIN DET:
YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.                        KEY-1: 341690960000100 1A06779 KEY-2: 426028208 KEY-3: 020106
                                                                                                          UNITS CODE: 08
FEDERAL STANDARD      100 UG/M3 (25 C), ANNUAL ARITHMETIC MEAN                     SECONDARY
                                   PRIMARY
STATE STANDARD         90 UG/M3 (0 C) ANNUAL ARITHMETIC MEAN         100 UG/M3 (25 C), ANNUAL ARITHMETIC MEAN
                                                                      90 UG/M3 (0 C) ANNUAL ARITHMETIC MEAN

         HOUR

DAY      06         18     NO.     SUM

01     10.00      10.00     2    20.0000
02                          0
03     10.00      10.00     2    20.0000
04                          0
05     20.00      20.00     2    40.0000
06                          0
07     30.00      30.00     2    60.0000
08                          0
09                          0
10                          0
11                          0
12                          0
13                          0
14                          0
15                          0
16                          0
17                          0
18                          0
19                          0
20     80.00      80.00     2    160.000
21                          0
22     130.0      130.0     2    260.000
23                          0
24     210.0      210.0     2    420.000
25     330.0      330.0     2    660.000
26     40.00      40.00     2    80.0000
27     370.0      370.0     2    740.000
28     410.0      410.0     2    820.000
```

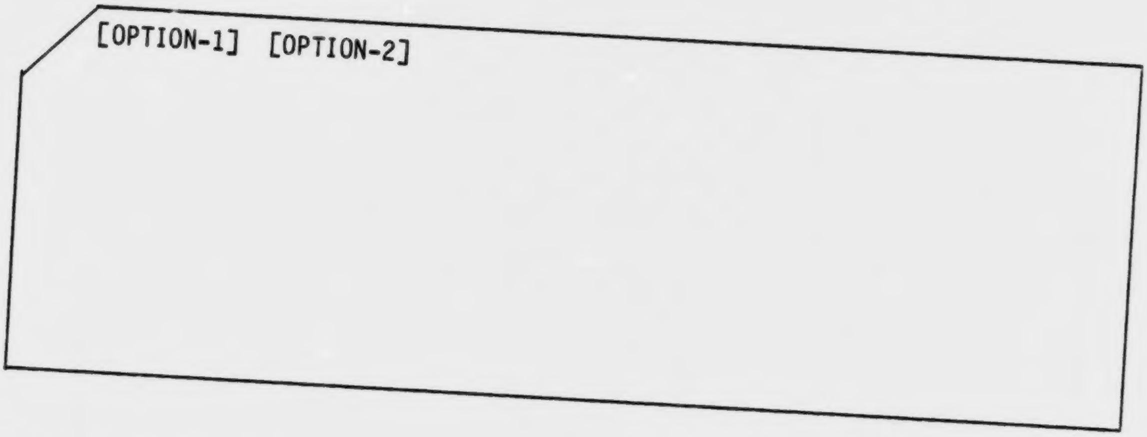
Figure 6.2.3-c. Sum Report

```
                        AQDHS-II MASTER FILE DETAILED REPORT PROGRAM  -  DIAGNOSTIC REPORT                              PAGE     1
PROGRAM NAME: ARPMSTR (AQ0230)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

USER-SPECIFIED OPTION: MEAN DISPLAY N > 9997


NUMBER OF OPTION STATEMENTS READ:                             2
NUMBER OF MASTER FILE RECORDS READ:                         331
NUMBER OF REPORT PAGES WRITTEN:                              71
NUMBER OF ERRORS DETECTED:                                    0
```

Figure 6.2.3-d. Diagnostic Report



The options can appear in any order and in any position on the card with the following exceptions:

1. There can be only one card.
2. All options must be punched within columns 1 through 72, inclusive.
3. There must be at least one space between the options if both are specified. A comma may be used as a separator rather than one or more spaces, and spaces may precede and/or follow the comma.

Figure 6.2.3-e. Option Card Format

```
//*
//*    PROCEDURE NAME: AQRPM20
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO GENERATE A DETAILED LISTING OF
//*    THE AQDHS-II MASTER FILE
//*
//*
//AQRPM20 PROC PROJECT='CN,EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPMSTR,
//             MSTRFIL=AQMASTER,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             STANFIL=AQSTANFL,
//             REGION1=190K,
//             TIME1='1,0',
//             OUT=A
//*
//REPORT  EXEC PGM=&PROGRAM,
//             REGION=&REGION1,
//             TIME=(&TIME1)
//*
//* PRODUCE A DETAILED LISTING OF THE MASTER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - CONTROL CARD
//*
//AQSINPUT  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* INPUT DATA SET - MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - PARAMETER FILE
//*
//AQSPARMC  DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - SITE FILE
//*
//AQSSITES  DD DSNAME=&PROJECT..DATA.&SITEFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - PARAMETER STANDARDS FILE
//*
//AQSTNDRD  DD DSNAME=&PROJECT..DATA.&STANFIL,
```

(page 1 of 2)

Figure 6.2.3-f. Cataloged Procedure AQRPM20

```
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - DETAILED REPORT
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//AQSREPTS  DD  SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

(page 1 of 2)

Figure 6.2.3-f - continued. Cataloged Procedure AQRPM20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER would be the full data set name of the AQDHS-II master file)
PROGRAM	ARPMSTR	Master file detailed report program
MSTRFIL	AQMASTER	Lowest-level index of master file
PARMFIL	AQPARMFL	Lowest-level index of parameter file
SITEFIL	AQSITEFL	Lowest-level index of site file
STNDFIL	AQSTANFL	Lowest-level index of parameter standards file
REGION1	190K	Region allocated for execution of ARPMSTR
TIME1	'1,0'	Time in minutes and seconds allocated for execution of ARPMSTR
OUT	A	SYSOUT class for all print files

Figure 6.2.3-g. Substitutable Parameters for AQRPM20

6.2.4 PARAMETER FILE DETAILED REPORT PROGRAM - ARPPARM (AQ0240)

6.2.4.1 Description

ARPPARM (AQ0240) produces a formatted listing of the AQDHS-II parameter file. The contents of each parameter file record are listed on two print lines and appropriate labels are printed to identify the individual fields.

6.2.4.2 File Formats

The parameter file is the only input to ARPPARM (AQ0240); for the parameter file format, see Figure 4.2.2-c. The detailed report is the only output; see Figure 6.2.4-a for a sample detailed report. Note the indented line at the bottom of the report page: it contains the parameter key information for the last record listed on the page. The footnote line at the bottom of each page allows the user to easily scan through the report to locate particular parameters.

6.2.4.3 Options

There are no options.

6.2.4.4 Error Messages

There are no error messages.

6.2.4.5 Cataloged JCL

6.2.4.5.1 JCL listing - ARPPARM (AQ0240) can be run by executing the cataloged procedure AQRPP10. See Figure 6.2.4-b for a listing of this procedure.

6.2.4.5.2 Cross-reference of DD names and files

Program Name: ARPPARM (AQ0240)

DD Name	File Description	Input/Output
AQSPARM	AQDHS-II parameter file	Input
AQSPRINT	Detailed report	Output

6.2.4.5.3 User-supplied JCL - To execute AQRPP10, the user will need to specify the name of the parameter file. See Figure 6.2.4-c for a description of the procedure's substitutable parameters.

6.2.4.5.4 Sample run stream - The following run stream would generate a detailed report of the parameter file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PARM0001':

```
//  EXEC  AQRPP10,
//        PARMFIL=PARM0001
```

6.2.4.6 Warnings and Special Instructions

There are no warnings and no special instructions.

6.2.4.7 Cost Considerations

The following estimates are for the execution of ARPPARM (AQ0240) on an IBM 370/168:

Number of records in AQDHS-II parameter file:	100 records
CPU time:	0.3 second
I/O time:	2.2 seconds
Total time:	2.5 seconds
Estimated cost:	$0.54

6.2.4.8 Related Programs and Procedures

Normally, the parameter file report procedure, AQRPP10, will be executed following an update of the parameter file. AQEMP10 is the parameter file maintenance procedure; see Section 4.2.2.5 for a discussion of this procedure.

```
                                        ARPPARM (AQ0240) SUMMARY MESSAGES
NUMBER OF PARAMETER FILE RECORDS READ:          89
NUMBER OF PARAMETER FILE RECORDS LISTED:        89

PROGRAM-NAME: ARPPARM (AQ0240)
REVISION LEVEL:  1-00
LAST UPDATE #:  24
DATE INCORPORATED:  OCTOBER 31, 1978
```

(page 1 of 2)

Figure 6.2.4-a - continued. Parameter File Detailed Report

```
                                    AQDHS-II PARAMETER FILE LISTING
PROGRAM-NAME: ARPPARM (AQ0240)                                                                          PAGE    1
REVISION LEVEL:  1-00
LAST UPDATE #:  24
DATE INCORPORATED:  OCTOBER 31, 1978

PARAMETER  METHOD  UNITS  MIN   DEC   STANDARD UNITS         USER UNITS          PARAMETER DESCRIPTION               ANALYSIS METHOD
  CODE      CODE   CODE   DET   IND  CODE CONV FACTOR     CODE CONV FACTOR       UNITS DESCRIPTION                   COLLECTION METHOD
  11101      91     01    0001   0    01     1.00000       01     1.00000        TOTAL SUSPENDED PARTICULATE          GRAVIMETRIC
                                                                                 U-GMS/M3 (25DEG C,1013 M-BARS)       HI-VOL
  11101      92     02    0011   1    01      .91600       02     1.00000        TOTAL SUSPENDED PARTICULATE          GRAVIMETRIC
                                                                                 U-GMS/M3 (0DEG C, 1013 M-BARS)       MEMBRANE SAMPLE
  11201      81     09    0001   2    01     1.00000       09     1.00000        SOILING INDEX (COH/1000LF)           TRANSMITTANCE
                                                                                 COHS/1000 LINEAR FEET                TAPE SAMPLER
  21101      51     90    0143   2    93      .35030       90     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC
                                                                                 TONS/SQUARE MILE-MONTH               BUCKET; JAR
  21101      51     91    0005   2    93    10.00000       91     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC
                                                                                 M-GMS/SQUARE CENTIMETER-MONTH        BUCKET; JAR
  21101      71     90    0143   2    93      .35030       90     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC (APCA)
                                                                                 TONS/SQUARE MILE-MONTH               BUCKET; JAR
  21101      71     91    0005   2    93    10.00000       91     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC (APCA)
                                                                                 M-GMS/SQUARE CENTIMETER-MONTH        BUCKET; JAR
  21101      81     90    0143   2    93      .35030       90     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC (ASTM)
                                                                                 TONS/SQUARE MILE-MONTH               BUCKET; JAR
  21101      81     91    0005   2    93    10.00000       91     1.00000        TOTAL SETTLED PARTICULATE            GRAVIMETRIC (ASTM)
                                                                                 M-GMS/SQUARE CENTIMETER-MONTH        BUCKET; JAR
  42101      11     05    0575   3    05     1.00000       05     1.00000        CARBON MONOXIDE                      NONDISPERSIVE INFRA-RED
                                                                                 M-GMS/M3 (25DEG C,1013 M-BARS)       INSTRUMENTAL
  42101      11     06    0628   3    05      .91600       06     1.00000        CARBON MONOXIDE                      NONDISPERSIVE INFRA-RED
                                                                                 M-GMS/M3 (0DEG C, 1013 M-BARS)       INSTRUMENTAL
  42101      11     07    0004   1    05     1.15000       07     1.00000        CARBON MONOXIDE                      NONDISPERSIVE INFRA-RED
                                                                                 PARTS PER MILLION (VOL/VOL)          INSTRUMENTAL
  42101      21     05    0063   2    05     1.00000       05     1.00000        CARBON MONOXIDE                      GAS CHROMATOGRAPHIC
                                                                                 M-GMS/M3 (25DEG C,1013 M-BARS)       INSTRUMENTAL
  42101      21     07    0004   1    05     1.15000       07     1.00000        CARBON MONOXIDE                      GAS CHROMATOGRAPHIC
                                                                                 PARTS PER MILLION (VOL/VOL)          INSTRUMENTAL
  42102      11     07    0001   0    05     1.80000       07     1.00000        CARBON DIOXIDE                       INFARARED ABSORPTION
                                                                                 PARTS PER MILLION (VOL/VOL)          INSTRUMENTAL

                                                               PARM CODE: 42102* METHOD: 11* UNITS CODE: 07**        PAGE 0001
```

Figure 6.2.4-a. Parameter File Detailed Report (page 1 of 2)

```
//*
//*   PROCEDURE NAME: AQRPP10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO PRODUCE A DETAILED LISTING OF
//*   THIS AQDHS-II PARAMETER FILE
//*
//*
//AQRPP10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPPARM,
//             TIME1='2,0',
//             PARMFIL=AQPARMFL,
//             OUT=A
//*
//METHPRT EXEC PGM=&PROGRAM,
//             TIME=(&TIME1)
//*
//*  LISTING OF AQDHS-II PARAMETER FILE WITH APPROPRIATE HEADINGS
//*  AND FOOTNOTES
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - PARAMETER FILE
//*
//AQSPARM   DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - PARAMETER FILE LISTING
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//*  OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

Figure 6.2.4.b. Cataloged Procedure AQRPP10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQPARMFL would be the full data set name of the parameter file)
PROGRAM	ARPPARM	Parameter file report program
TIME1	'2,0'	Time allocated for execution of ARPPARM
PARMFIL	AQPARMFL	Lowest-level index of parameter file
OUT	A	SYSOUT class for all print files

Figure 6.2.4-c. Substitutable Parameters for AQRPP10

6.2.5 PARAMETER STANDARDS FILE DETAILED REPORT PROGRAM - ARPSTND (AQ0250)

6.2.5.1 Description

ARPSTND (AQ0250) produces a detailed report of the AQDHS-II parameter standards file. The report is in a columnized format which includes headings and a footnote feature. The footnote appears at the bottom right-hand side of each page and contains the parameter code, state code, and standard number of the first parameter standard record appearing on that page. The footnote also contains the report page number.

6.2.5.2 File Formats

The AQDHS-II parameter standards file, is the only input to ARPSTND (AQ0250). This file is not checked for sequence errors by this program; therefore, the report will be in the same sequence as the AQDHS-II parameter standards file. See Figure 4.4.2-a for a description of the record format for the parameter standards file.

The report output by the program contains the detailed listing and diagnostic messages. See Figure 6.2.5-a for a sample of this report.

6.2.5.3 Options

There are no options.

6.2.5.4 Error Messages

There are no error messages.

6.2.5.5 Cataloged JCL

6.2.5.5.1 JCL listing - ARPSTND (AQ0250) is executed by the cataloged procedure AQRPD10. See Figure 6.2.5-b for a listing of this procedure.

6.2.5.5.2 Cross-reference of DD names and files

Program Name: ARPSTND (AQ0250)

DD Name	File Description	Input/Output
PARMSTDS	AQDHS-II parameter standards file	Input
AQSPRINT	Detailed report	Output

6.2.5.5.3 User-supplied JCL - The user must specify the data set name of the AQDHS-II parameter standards file. See Figure 6.2.5-c for a description of the procedure's substitutable parameters.

6.2.5.5.4 Sample run stream - The following run stream would produce a detailed report of the AQDHS-II parameter standards file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.HTSTNDAA':

```
// EXEC  AQRPD10,
//       PRMSTDS=HTSTNDAA
```

6.2.5.6 Warnings and Special Instructions

The user should be careful that he submits the current AQDHS-II parameter standards file to insure an up-to-date report.

6.2.5.7 Cost Considerations

A test run of ARPSTND (AQ0250) was executed on an IBM 370/168 using a test AQDHS-II parameter standards file as input. The following estimates were obtained from that test run:

AQDHS-II parameter standards file:	46 records
Parameter standards records printed:	46 records
CPU time:	0.2 second
I/O time:	2.6 seconds
Total time:	2.8 seconds
Estimated cost:	$0.93

6.2.5.8 Related Programs and Procedures

There are no related programs or procedures.

```
                              AQDHS-II PARAMETER STANDARDS FILE LISTING
                                                                                          PAGE    1
PROGRAM-NAME: ARPSTND (AQ0250)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

**          K E Y       **       **UNIT
PARM-CODE    F/S    STD-NBR                            DESCRIPTION                  **
---------------------------------------------------------------------------------------------------------

  11101       F       01           01        75 UG/M3 (25 C) ANNUAL GEOMETRIC MEAN
                                   01        60 UG/M3 (25 C) ANNUAL GEOMETRIC MEAN
  11101       F       02           02        75 UG/M3 (0 C) ANNUAL GEOMETRIC MEAN
                                   02        60 UG/M3 (0 C) ANNUAL GEOMETRIC MEAN
  11101       F       03           01       260 UG/M3 (25 C) 24 HOUR MAXIMUM, 1 PER YEAR.
                                   01       150 UG/M3 (25 C) 24 HOUR MAXIMUM, 1 PER YEAR.
  11101       S       01           02        60 UG/M3 (0 C) ANNUAL GEOMETRIC MEAN
                                   02        60 UG/M3 (0 C) ANNUAL GEOMETRIC MEAN
  11101       S       02           01       250 UG/M3 (25 C) 24 HOUR MAXIMUM, 1 PER YEAR
                                   01       120 UG/M3 (25 C) 24 HOUR MAXIMUM,1 PER YEAR
  42101       F       01           02    10,000 UG/M3 (0 C)   8 HR. MAX, 1 PER YR.
                                   02    10,000 UG/M3 (0 C)  8 HR. MAX, 1 PER YR.
  42101       F       02           01    40,000 UG/M3 (25 C)  1 HR. MAX, 1 PER YR.
                                   01    40,000 UG/M3 (25 C) 1 HR. MAX, 1 PER YR.
  42101       F       03           07         9 PARTS/MILLION , 8 HR MAX, 1 PER YEAR
                                   07         9 PARTS/MILLION , 8 HR MAX, 1 PER YEAR
  42101       F       04           07        35 PARTS/MILLION, 1 HR. MAX, 1 PER YR
                                   07        35 PARTS/MILLION, 1 HR. MAX, 1 PER YR
  42101       S       01           01    10,000 UG/M3 (25 C), 8 HR. MAX, 1 PER YR.
                                   01    10,000 UG/M3 (25 C) 8 HR. MAX, 1 PER YR.
  42101       S       02           01    35,000 UG/M3 (25 C)  1 HR. MAX, 1 PER YR.
                                   01    35,000 UG/M3 (25 C) 1 HR. MAX, 1 PER YR.
  42101       S       03           07         9 PARTS/MILLION , 8 HR MAX, 1 PER YEAR
                                   07         9 PARTS/MILLION , 8 HR MAX, 1 PER YEAR
  42101       S       04           07        30 PARTS/MILLION, 1 HR. MAX, 1 PER YR
                                   07        30 PARTS/MILLION, 1 HR. MAX, 1 PER YR
  42401       F       01           01       365 UG/M3 (25 C)  24 HOUR MAXIMUM, 1 PER YEAR
                                   02      1300 UG/M3 (0 C), 3 HR. MAX.,1 PER YR
  42401       F       02           07      0.14 PARTS PER MILLION  24 HOUR MAX, 1 PER YEAR
                                   07       0.5 PARTS/MILLION, 3 HR MAX, 1 PER YEAR
  42401       F       03           01        80 UG/M3 (25 C), ANNUAL ARITHMETIC MEAN

  42401       F       04           07      0.03 PARTS/MILLION, ANNUAL ARITHMETIC MEAN

  42401       S       01           01        60 UG/M3 (25 C)  ANNUAL ARITHMETIC MEAN
                                   07       0.4 PARTS/MILLION,  3 HR.MAX, 1 PER YEAR
  42401       S       02           01       360 UG/M3 (25 C) , 24 HR. MAX., 1 PER YEAR

  42401       S       03           07      0.03 PARTS/MILLION, ANNUAL ARITHMETIC MEAN

  42401       S       04           07      0.09 PARTS/MILLION, 24 HR. MAX., 1 PER YEAR

  42602       F       01           01       100 UG/M3 (25 C), ANNUAL ARITHMETIC MEAN
                                   01       100 UG/M3 (25 C), ANNUAL ARITHMETIC MEAN
  42602       F       02           07      0.05 PARTS/MILLION, ANNUAL ARITHMETIC MEAN
                                   07      0.05 PARTS/MILLION, ANNUAL ARITHMETIC MEAN
  42602       S       01           02        90 UG/M3 (0 C) ANNUAL ARITHMETIC MEAN
                                   02        90 UG/M3 (0 C) ANNUAL ARITHMETIC MEAN

                                                 PARM-CODE: 11101* F/S: F* STD-NBR: 01**   PAGE    1
```

Figure 6.2.5-a. Parameter Standards File Detailed Report (page 1 of 2)

```
                              ARPSTND (AQ0250) SUMMARY MESSAGES
PARAMETER STANDARDS RECORDS READ:       45
PARAMETER STANDARDS RECORDS LISTED:     45

PROGRAM-NAME: ARPSTND (AQ0250)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

Figure 6.2.5-a - continued. Parameter Standards File Detailed Report (page 2 of 2)

```
//*
//*   PROCEDURE NAME: AQRPD10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO OBTAIN A DETAILED LISTING OF
//*   THE PARAMETER STANDARDS FILE
//*
//*
//AQRPD10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPSTND,
//             TIME1='1,0',
//             STANFIL=AQSTANFL,
//             OUT=A
//*
//PRTSTDS  EXEC PGM=&PROGRAM,
//         TIME=(&TIME1)
//*
//*  LIST PARAMETER STANDARDS FILE WITH APPROPRIATE HEADINGS AND
//*  FOOTNOTES
//*
//STEPLIB DD DSNAME=&PROJECT..LOAD,
//        VOLUME=(PRIVATE,RETAIN),
//        DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - PARAMETER STANDARDS FILE LISTING
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//*  INPUT DATA SET - PARAMETER STANDARDS FILE
//*
//PARMSTDS  DD DSNAME=&PROJECT..DATA.&STANFIL,
//          DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

Figure 6.2.5-b. Cataloged Procedure AQRPD10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.STANFILE would be the full data set name of the AQDHS-II parameter standards file)
PROGRAM	ARPSTND	Parameter standards file detailed report program
TIME	'1,0'	Time allocated for execution of ARPSTND
STANFFL	AQSTANFL	Lowest-level index of AQDHS-II parameter standards file
OUT	A	SYSOUT class for all print files

Figure 6.2.5-c. Substitutable Parameters for AQRPD10

6.2.6 SITE FILE DETAILED REPORT PROGRAM - ARPSITE (AQ0260)

6.2.6.1 Description

ARPSITE (AQ0260) produces a formatted listing of the records in the AQDHS-II site file. All information for each record is contained on one line of the report. The report lists the sites in the same order as they occur in the AQDHS-II master file.

6.2.6.2 File Formats

The site file to be listed is the only input to ARPSITE (AQ0260); the detailed report is the only output. The site file format is discussed in Section 4.3.2.2, an example of the detailed report is shown in Figure 6.2.6-a. Note that the report page has a footnote to indicate the first site listed on that page. These footnotes make it easier to locate particular sites in the report.

6.2.6.3 Options

There are no options.

6.2.6.4 Error Messages

There are no error messages.

6.2.6.5 Cataloged JCL

6.2.6.5.1 JCL listing - ARPSITE (AQ0260) is executed by the cataloged procedure AQRPS10. See Figure 6.2.6-b for a listing of this procedure.

6.2.6.5.2 Cross-reference of DD names and files

Program Name: ARPSITE

DD Name	File Description	Input/Output
SITEFILE	AQDHS-II site file	Input
SORTWK01	Sort work file	Internal
AQSPRINT	Detailed report	Output

6.2.6.5.3 User-supplied JCL - Normally the only specification that the user need make to run the site report procedure is the name of the site file itself. See Figure 6.2.6-c for a description of the procedure's substitutable parameters.

6.2.6.5.4 Sample run stream - The following run stream would produce a detailed report of the site file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.SITE0001':

```
//      EXEC  AQRPS10,
//      SITEFIL=SITE0001
```

6.2.6.6 Warnings and Special Instructions

The site file maintenance program, AEMSITE (AQ0080), does not have the capability of listing the site file; therefore, ARPSITE (AQ0260) must be run to list the contents of the site file.

6.2.6.7 Cost Considerations

Listed below are cost-related data for a particular run of ARPSITE (AQ0260) on an IBM 370/168:

Number of records in site file:	24 records
I/O time:	6.3 seconds
CPU time:	.5 second
Total time:	6.8 seconds
Estimated cost:	$1.78

6.2.6.8 Related Programs and Procedures

There are no related programs and no related procedures.

```
                                     AQDHS-II SITE FILE LISTING                                                PAGE    1

PROGRAM NAME: ARPSITE (AQ0260)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED:  OCTOBER 31, 1978

**              K E Y               **
STATE   AREA    SITE   AGENCY    PROJECT    AQCR   COUNTY   SLAMS-ID                        DESCRIPTION
------------------------------------------------------------------------------------------------------------------------

  10    0001    001      E          02       049    1080                N.10TH. AVE., JACKSONVILLE, DUVAL CO.
  12    0001    001      C          01       060    0080                MOUNTAIN ROAD, HILO, HAWAII CO.
  12    0001    002      C          01       060    0140                PEARL HARBOR, HONOLULU, HONOLULU CO.
  12    0001    003      C          01       060    0140                WAIKIKI, HONOLULU, HONOLULU CO.
  12    0001    004      C          01       060    0140                SCHOFIELD BARRACKS, HONOLULU CO.
  12    0001    005      C          01       060    0140                PEARL CITY, HONOLULU CO.
  12    0001    006      C          01       060    0140                WAHIAWA, HONOLULU CO.
  12    0001    007      C          01       060    0140                KANEOHE, HONOLULU CO.
  12    0001    008      C          01       060    0140                KAILUA, HONOLULU CO.
  20    0001    004      B          03       108    0045                GLACIER DR., CARIBOU, AROOSTOOK CO.
  34    0002    007      D          05       136    1480                CHERRY ST., WINSTON-SALEM, FORSYTH CO.
  34    0003    002      G          04       136    1780                REIDSVILLE HWY., GREENSBORO, GUILFORD CO.
  34    0003    010      G          04       165    3500                CHIMNEY ROCK, LAKE LURE, RUTHERFORD CO.
  34    0001    002      A          06       166    2120                HWY. 301 BUS., SMITHFIELD, JOHNSTON CO.
  34    0003    004      G          04       166    4160                DOWNTOWN BLVD., RALEIGH, WAKE CO.
  34    0003    008      G          04       167    2360                HWY. 321 N., LINCOLNTON, LINCOLN CO.
  34    0002    005      D          05       167    2580                TRYON RD., CHARLOTTE, MECKLENBURG CO.
  34    0002    003      D          05       168    1020                ROANOKE ISLAND, MANTEO, DARE CO.
  34    0001    001      A          06       169    0960                YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.
  34    0003    006      G          04       170    1140                COURTHOUSE, KENANSVILLE, DUPLIN COUNTY
  34    0002    001      D          05       170    2880                WRIGHTSVILLE BEACH, NEW HANOVER CO.
  34    0001    004      A          06       170    2980                GUM BRANCH RD., JACKSONVILLE, ONSLOW CO.
  34    0001    003      A          06       171    0480                BILTMORE ESTATES, ASHEVILLE, BUNCOMBE CO.
  37    0001    234      F          05       184    0600                MCALISTER RD., NORMAN, CLEVELAND CO.
  37    2240    999      A          05       186    3020                LIBERTY MOUNDS, TULSA, TULSA CO.
  37    2260    993      A          05       186    3020                WYNONA, TULSA, TULSA CO.
  37    2260    995      A          05       186    3020                SKIATOOK LAKE, TULSA, TULSA CO.
  37    3000    001      A          05       186    3020                TULSA INTERNATIONAL AIRPORT, TULSA, TULSA CO.
  37    3000    110      G          01       186    3020                TULSA PUBLIC HEALTH, TULSA, TULSA CO.
  37    3000    127      F          02       186    3020                MOHAWK BLVD, TULSA, TULSA CO.
  37    3000    132      F          02       186    3020                APACHE ST., TULSA, TULSA CO.
  37    3000    997      A          05       186    3020                TULSA PUBLIC HEALTH, TULSA, TULSA CO.
  37    3000    998      A          05       186    3020                TULSA POST OFFICE, TULSA, TULSA CO.
  37    3020    996      A          05       186    3020                SPERRY, TULSA, TULSA CO.
  37    3140    992      A          05       186    3020                OCHELATA, TULSA, TULSA CO.
  37    3140    994      A          05       186    3020                VERA POST OFFICE, TULSA, TULSA CO.

                             STATE: 10* AREA: 0001* SITE: 001* AGENCY: E* PROJECT: 02**                        PAGE    1
```

(page 1 of 2)

Figure 6.2.6-a. Site File Detailed Report

```
                              ARPSITE (AQ0260) SUMMARY MESSAGES

SITE FILE RECORDS READ         36
SITE FILE RECORDS PRINTED      36

PROGRAM NAME: ARPSITE (AQ0260)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED:  OCTOBER 31, 1978
```

Figure 6.2.6-a - continued. Site File Detailed Report (page 2 of 2)

```
//*
//*   PROCEDURE NAME: AQRPS10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*   THIS PROCEDURE ALLOWS THE USER TO PRODUCE A DETAILED LISTING
//*   OF THE AQDHS-II SITE FILE
//*
//*
//AQRPS10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPSITE,
//             TIME1='1,0',
//             SITEFIL=AQSITEFL,
//             OUT=A,
//             TEMP=SYSDA,
//             WORKSPC=50
//*
//PRINT    EXEC PGM=&PROGRAM,
//            TIME=(&TIME1),
//            REGION=100K
//*
//*  LIST SITE FILE WITH APPROPRIATE HEADINGS AND FOOTNOTES
//*
//STEPLIB  DD DSNAME=&PROJECT..LOAD,
//            VOLUME=(PRIVATE,RETAIN),
//            DISP=(SHR,PASS)
//SORTLIB  DD DSNAME=SYS1.SORTLIB,
//            DISP=(SHR,PASS)
//*
//*  SORT WORK FILES
//*
//SORTWK01 DD UNIT=&TEMP,
//            SPACE=(CYL,(&WORKSPC),,CONTIG)
//*
//SORTWK02 DD UNIT=&TEMP,
//            SPACE=(CYL,(&WORKSPC),,CONTIG)
//*
//SORTWK03 DD UNIT=&TEMP,
//            SPACE=(CYL,(&WORKSPC),,CONTIG)
//*
//*  INPUT DATA SET - SITE FILE
//*
//SITEFILE DD DSN=&PROJECT..DATA,&SITEFIL,
//            VOLUME=(PRIVATE,RETAIN),
//            DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - SITE FILE LISTING
//*
//AQSPRINT DD SYSOUT=&OUT
//*
//*  OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSDBOUT DD SYSOUT=&OUT
//*
//SYSOUT   DD SYSOUT=&OUT
//*
//SYSPRINT DD SYSOUT=&OUT
//*
//SYSDTERM DD SYSOUT=&OUT
//*
//SYSUDUMP DD SYSOUT=&OUT
//*
```

Figure 6.2.6-b. Cataloged Procedure AQRPS10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names
PROGRAM	ARPSITE	Site file detailed report program
SITEFIL	AQSITEFL	Lowest-level index of site file
TIME1	'1, 0'	Time allocated for execution of ARPSITE
TEMP	SYSDA	Unit type for temporary work space
WORKSPC	50	Number of units to be allocated for the sort work space
OUT	A	SYSOUT class for all print files

Figure 6.2.6-c. Substitutable Parameters for AQRPS10

6.3 EPA-REQUIRED REPORTS

6.3.1 INTRODUCTION

Federal law requires the submission of air quality data to EPA for inclusion in the SAROAD data base. AQDHS-II provides the user with the capability to automatically generate SAROAD quarterly reports from the AQDHS-II master file by executing the AQDHS-II to SAROAD conversion program, ARPSARD (AQ0220).

The AQDHS-II to SAROAD conversion flowchart is shown in Figure 6.3.1-a. ARPSARD (AQ0220) converts readings from the master file to SAROAD transaction format. Only readings that have not previously been submitted to SAROAD and that are dated prior to or equal to the date on the option card for ARPSARD (AQ0220) are converted to SAROAD transaction format. Readings that are to be added to the SAROAD data base are placed in the SAROAD add file and readings that are to replace or delete previously submitted readings are placed in the SAROAD change file. A new master file (indicating the new submission status of the readings) and a diagnostic report are produced.

A detailed discussion of ARPSARD (AQ0220) is presented in Section 6.3.2.

ARPSARD (AQ0220) can be executed using the cataloged procedure AQRPM05, which is discussed in Section 6.3.2.5. A sample run stream for generating SAROAD data from the master file is shown in Section 6.3.2.5.4.

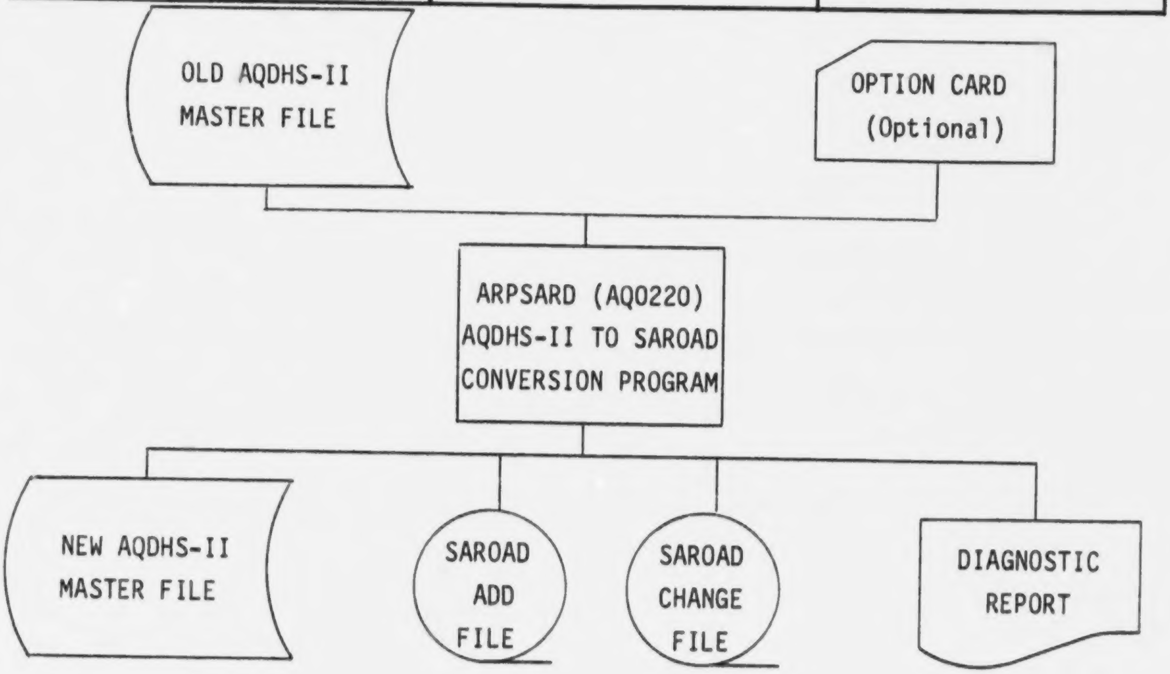


Figure 6.3.1-a. AQDHS-II to SAROAD Conversion Flowchart

6.3.2 AQDHS-II TO SAROAD CONVERSION PROGRAM - ARPSARD (AQ0220)

6.3.2.1 Description

ARPSARD (AQ0220) provides the user with the capability of periodically extracting new or changed data from the AQDHS-II master file for inclusion in the SAROAD data base. Only data which have not been previously sent to SAROAD are sent. All data which have been previously sent to SAROAD but have been changed or deleted are sent as a change transaction. All new data are sent as an add transaction.

AQDHS-II handles user specified deletes on the master file by changing the reading to a null value and setting the status flag to change. These deletes are then included in the change transaction file which is generated for SAROAD. When the DELETES option of the SAROAD editor (NA067) is invoked, it considers any null reading (9999) as a delete even though they appear in the change file. Therefore, it is important that the AQDHS-II user indicate to his regional office that his change file, or tape, was created by AQDHS-II and that the SAROAD editor program should be run using the DELETES option.

As each reading is sent to SAROAD, its associated reading status flag is changed to indicate that it has been sent. This change occurs as follows: if the reading status flag is 'A' or 'C', it is changed to 'S' and if the reading status flag is 'B' or 'D', it is changed to 'T'. A reading status flag of 'S' indicates that the reading has been sent to SAROAD, but it has not undergone anomaly screening. A reading status flag of 'T' indicates that the reading has been sent to SAROAD and it has undergone anomaly screening.

There is a submission status flag associated with each record which is different from the reading status flags. This flag is used by certain programs to indicate whether or not the readings have been sent to SAROAD, whether or not the readings have undergone anomaly screening, and whether or not the record contains any non-null readings. Therefore, it is necessary for ARPSARD (AQ0220) to update this flag as follows: if the record submission flag is 'V', it is changed to 'T' and if it is 'N', it is changed to 'S'. Records having a submission status flag of 'X' are deleted from the master file after being processed by ARPSARD (AQ0220).

Refer to Figure 5.5.5-b for a description of the record submission flag and Figure 5.5.5-c for a description of the reading status flag.

6.3.2.2 File Formats

Input to this program consists of the AQDHS-II master file and an option card. See Figure 4.5.3-a for a description of the master file format and Section 6.3.2.3 for a discussion of the option card.

Output consists of a new AQDHS-II master file, a SAROAD add file, a SAROAD change file, and a diagnostic report.

The output AQDHS-II master file differs from the input master file in that the submission status flags and the reading status flags have been changed as necessary. The output master file might also contain fewer records than the input master file since some records may have been deleted.

The output SAROAD files contain SAROAD format transactions. The SAROAD add file begins with a '$2' action card followed by all add transactions, if any; the SAROAD change file begins with a '$3' action card followed by all change transactions, if any. The '$2' and '$3' action cards indicate that the respective files were created by AQDHS-II and what action is to be performed by the Regional Office on the transactions following them. See Figure 5.5.2-a for a description of the SAROAD transaction format.

record contains any non-null readings. Therefore, it is necessary for ARPSARD (AQ0220) to update this flag as follows: if the record submission flag is 'V', it is changed to 'T' and if it is 'N', it is changed to 'S'. Records having a submission status flag of 'X' are deleted from the master file after being processed by ARPSARD (AQ0220).

Refer to Figure 5.5.5-b for a description of the record submission flag and Figure 5.5.5-c for a description of the reading status flag.

6.3.2.2 File Formats

Input to this program consists of the AQDHS-II master file and an option card. See Figure 4.5.3-a for a description of the master file format and Section 6.3.2.3 for a discussion of the option card.

Output consists of a new AQDHS-II master file, a SAROAD add file, a SAROAD change file, and a diagnostic report.

The output AQDHS-II master file differs from the input master file in that the submission status flags and the reading status flags have been changed as necessary. The output master file might also contain fewer records than the input master file since some records may have been deleted.

The output SAROAD files contain SAROAD format transactions. The SAROAD add file begins with a '$2' action card followed by all add transactions, if any; the SAROAD change file begins with a '$3' action card followed by all change transactions, if any. The '$2' and '$3' action cards indicate that the respective files were created by AQDHS-II and what action is to be performed by the Regional Office on the transactions following them. See Figure 5.5.2-a for a description of the SAROAD transaction format.

See Figure 6.3.2-a for a sample diagnostic report. Although the output transactions are normally written to tapes and are not listed in this report, they are listed as a sample in Figure 6.3.2-b.

6.3.2.3 Options

The option card for ARPSARD (AQ0220) is used to supply the program with a date to be used in selecting records from the AQDHS-II master file. All records dated on or prior to the option date will be selected for processing; e.g., a record dated January 1979 (7901) would be selected for processing if the option date were January 1979 (7901). No record dated after the option date would be selected for SAROAD processing. If no option card is submitted, or if the option date is invalid, all records would be processed by this program.

The selection date is coded in columns 1 through 4 of the option card; it consists of the year and month, in that order. Refer to Figure 6.3.2-c for a description of the option card format.

6.3.2.4 Error Messages

There are no error messages.

6.3.2.5 Cataloged JCL

6.3.2.5.1 JCL listing - ARPSARD (AQ0220) can be run by executing the cataloged procedure AQRPM05. See Figure 6.3.2-d for a listing of this procedure.

6.3.2.5.2 Cross-reference of DD names and files

Program Name: ARPSARD (AQ0220)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSOPTIN	Option card	Input
AQSNEWMS	New AQDHS-II master file	Output
AQSADDFL	SAROAD add file	Output
AQSCHGFL	SAROAD change file	Output
AQSPRINT	Diagnostic report	Output

6.3.2.5.3 User-supplied JCL - An option card may be submitted with the run to insure that the user sends to SAROAD only that data collected prior or equal to a certain date. An option card is not necessary if the user wishes to process the entire AQDHS-II master file for SAROAD selection. If no option card is present, the default is to submit all appropriately flagged data in the master file. The user must supply the data set names for the AQDHS-II master file, the SAROAD add file, the SAROAD change file, and the new AQDHS-II master file, as well as tape information for the add and change files. See Figure 6.3.2-e for a description of the procedure's substitutable parameters.

6.3.2.5.4 Sample run stream - The following run stream would produce a tape containing the SAROAD add file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ADDTRAN', a tape containing the SAROAD change file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.CHGTRAN', and the new AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.NEWMASTR' from the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.OLDMASTR':

```
//  EXEC  AQRPM05,
//        OLDMSTR=OLDMASTR,
//        NEWMSTR=NEWMASTR,
//        ADDFILE=ADDTRAN,
```

6.3.2.5.2 <u>Cross-reference of DD names and files</u>

Program Name: ARPSARD (AQ0220)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSOPTIN	Option card	Input
AQSNEWMS	New AQDHS-II master file	Output
AQSADDFL	SAROAD add file	Output
AQSCHGFL	SAROAD change file	Output
AQSPRINT	Diagnostic report	Output

6.3.2.5.3 <u>User-supplied JCL</u> - An option card may be submitted with the run to insure that the user sends to SAROAD only that data collected prior or equal to a certain date. An option card is not necessary if the user wishes to process the entire AQDHS-II master file for SAROAD selection. If no option card is present, the default is to submit all appropriately flagged data in the master file. The user must supply the data set names for the AQDHS-II master file, the SAROAD add file, the SAROAD change file, and the new AQDHS-II master file, as well as tape information for the add and change files. See Figure 6.3.2-e for a description of the procedure's substitutable parameters.

6.3.2.5.4 <u>Sample run stream</u> - The following run stream would produce a tape containing the SAROAD add file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ADDTRAN', a tape containing the SAROAD change file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.CHGTRAN', and the new AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.NEWMASTR' from the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.OLDMASTR':

```
//  EXEC  AQRPM05,
//        OLDMSTR=OLDMASTR,
//        NEWMSTR=NEWMASTR,
//        ADDFILE=ADDTRAN,
//        CHNGEFL=CHGTRAN
//SUBMIT.OPTION DD *
7902
/*
```

6.3.2.6 Warnings and Special Instructions

You should indicate to your Regional Office that the SAROAD add and change files were created by AQDHS-II, and that the SAROAD editor program (NA067) should be executed using the 'DELETES' option.

If no option card for ARPSARD (AQ0220) is submitted, all AQDHS-II master file records will be selected for SAROAD selection processing.

6.3.2.7 Cost Considerations

A test run of ARPSARD (AQ0220) was executed on an IBM 370/168 using a test AQDHS-II master file. The following estimates are from that test run:

Input AQDHS-II master file:	2140 records
Output AQDHS-II master file:	2140 records
Number of add transactions:	9852 transactions
Number of change transactions:	0 transaction
Number of add readings:	9852 readings
Number of change readings:	0 reading
CPU time:	12.0 seconds
I/O time:	12.5 seconds
Total time:	24.5 seconds
Estimated cost:	$4.04

```
//        CHNGEFL=CHGTRAN
//SUBMIT.OPTION DD *
7902
/*
```

6.3.2.6 Warnings and Special Instructions

You should indicate to your Regional Office that the SAROAD add and change files were created by AQDHS-II, and that the SAROAD editor program (NA067) should be executed using the 'DELETES' option.

If no option card for ARPSARD (AQ0220) is submitted, all AQDHS-II master file records will be selected for SAROAD selection processing.

6.3.2.7 Cost Considerations

A test run of ARPSARD (AQ0220) was executed on an IBM 370/168 using a test AQDHS-II master file. The following estimates are from that test run:

Input AQDHS-II master file:	2140 records
Output AQDHS-II master file:	2140 records
Number of add transactions:	9852 transactions
Number of change transactions:	0 transaction
Number of add readings:	9852 readings
Number of change readings:	0 reading
CPU time:	12.0 seconds
I/O time:	12.5 seconds
Total time:	24.5 seconds
Estimated cost:	$4.04

6.3.2.8 Related Programs and Procedures

There are no related programs or procedures.

```
                         AQDHS-II TO SAROAD CONVERSION PROGRAM  -  DIAGNOSTIC REPORT                      PAGE    1

PROGRAM NAME: ARPSARD (AQ0220)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

DATE OF 12 79 USED FOR SAROAD SELECTION  CRITERIA

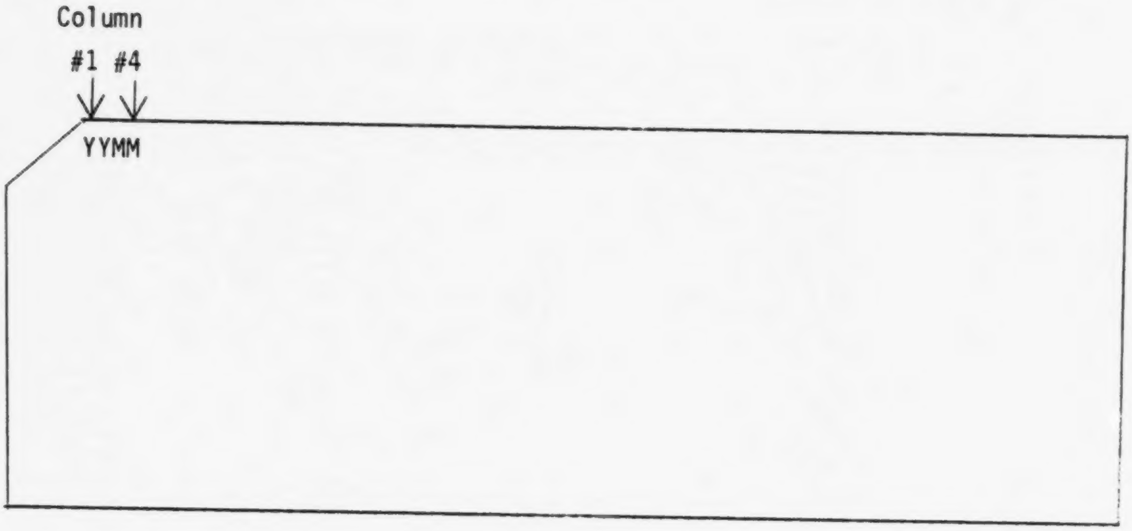
NUMBER OF FILE RECORDS READ:
NUMBER OF MASTER FILE RECORDS DELETED USING THE CHANGE OPTION:        341
NUMBER OF FILE RECORDS WRITTEN:                                         0
NUMBER OF ADD TRANSACTIONS SUBMITTED TO SAROAD:                       341
NUMBER OF CHANGE TRANSACTIONS SUBMITTED TO SAROAD:                     51
NUMBER OF ADD READINGS SUBMITTED TO SAROAD:                             0
NUMBER OF CHANGE READINGS SUBMITTED TO SAROAD:                        242
                                                                        0
```

Figure 6.3.2-a. Diagnostic Report

```
$2    ADD TRANSACTIUNS CREATED BY AUDHS
1120001001C011790101004240133021 000 001 000 000 000 000 000 000 000 001 004 004
1120001001C011790101124240133021 006 008 004 004 005 005 002 001 000 000 000 000
1120001001C011790102004240133021 000 000 000                         005 006 007
1120001001C011790102124240133021 007 008 010 011 010 011 010 011 009 008 008 007
1120001001C011790131004240133021 005 005 006 007 007 006 006 006 008 011 011 013
1120001001C011790131124240133021 013 013 014 012
1120001001C011790201004240133021 007 007 006 005 004 004 004 007 009 010 011 012
1120001001C011790201124240133021 014 013 012 012 008 007 007 007 007 007 008 007
1120001001C011790203004240133021 000 000 000 000 000 000 000 000
1120001001C011790203124240133021     000 000 002 004 004 006 006 007 003 000 000
1340001001A061790101001110191010 001 001 002 003 005 00880039021
1340001001A061790108001110191010 008 008 016 024 040 014 004 018
1340001001A051790110001110191010                                 013 013 026 039
1340001001A061790110121110191010 015 004 019 023 021 021 042 013 005 018 023 041
1340001001A061790120001110191010 033 033 018 002 020 022 042 014 004 004 010 015
1340001001A061790120121110191010 025 040 015 005 037 037 028 017 045 012 007 019
1340001001A061790131001110191010                                 041 041 038 032
1340001001A061790131121110191010 020 002 022 024
1340001001A061790328004240131010 037 0379928
1340001001A065790301054240133021 001 001 002
1340001001A065790302054240133021 001 001 002
1340001001A065790303054240133021 002 002 004
1340001001A065790304054240133021 003 003 006
1340001001A065790305054240133021 005 005 010
1340001001A065790306054240133021 008 008 016
1340001001A065790308054240133021 021 021 042
1340001001A065790324054240133021 033 033 018
1340001001A065790326054240133021 004 004 010
1340001001A065790330054240133021 041 041 038
1340001001A066790201064260282072 001 001
1340001001A066790203064260282072 001 001
```

```
$3    CHANGE TRANSACTIONS CREATED BY AUDHS. RUN SAROAD EDITOR WITH DELETES OPTION
1100001001E021710606004240111073 080 100 101 102 102 110 113 110 110 121 110 100
1100001001E021710606124240111073 080 080 090 090 099 099 099 100 100 100 121 122
1100001001E02171060700424011107099999999999999999999999999999999999999999999999
1100001001E02171060712424011107099999999999999999999999999999999999999999999999
1100001001E02171062100424011107099999999999999999999999999999999999999999999999
1100001001E02171062112424011107099999999999999999999999999999999999999999999999
1100001001E021710622004240111073 080 080 090 090 099 099 099 100 100 100 121 122
1100001001E021710622124240111073 248 200 201 181 176 154 121 100 090 080 070 060
```

Figure 6.3.2-b. Sample Transactions



1. Replace YY with the selection year.
2. Replace MM with the selection month.

Figure 6.3.2-c. Option Card Format

```
//*
//*    PROCEDURE NAME: AQRPM05
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO GENERAGE THE QUARTERLY REPORT
//*    FROM AQDHS-II TO SAROAD AND TO CREATE A NEW AQDHS-II MASTER FILE
//*    WITH THE STATUS FLAGS SET APPROPRIATELY
//*
//*
//AQRPM05 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPSARD,
//             OLDMSTR=AQMASTER,
//             NEWMSTR=AQMSTSNT,
//             UNIT1=3330,
//             UNIT2=2400,
//             UNIT3=2400,
//             SERIAL1=CDHSPK,
//             SERIAL2=ADDTPE,
//             SERIAL3=CHGTPE,
//             DISP1='NEW,CATLG,DELETE',
//             DISP2='NEW,KEEP',
//             DISP3='NEW,KEEP',
//             SPCUNIT=TRK,
//             PRIMARY=20,
//             SECNDRY=10,
//             ADDFILE=ADDFILE,
//             CHNGEFL=CHNGEFL,
//             LABNO1=1,
//             LABNO2=1,
//             LABCK1=BLP,
//             LABCK2=BLP,
//             OUT=A
//*
//SUBMIT  EXEC PGM=&PROGRAM,
//             REGION=60K,
//             TIME=(6,0)
//*
//* CONVERT AQDHS-II MASTER FILE TO SAROAD INPUT FORMAT
//*
//STEPLIB    DD DSNAME=&PROJECT..LOAD,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//           DD DSNAME=SYS1.COBLIB,
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - OPTION CARD FILE
//*
//AQSOPTIN DD DDNAME=OPTION,
//          DCB=BLKSIZE=80
//*
//* INPUT DATA SET - OLD AQDHS-II MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&OLDMSTR,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
```

(page 1 of 2)

Figure 6.3.2-d. Cataloged Procedure AQRPM05

```
//* OUTPUT DATA SET - NEW AQDHS-II MASTER FILE
//*
//AQSNEWMS  DD UNIT=&UNIT1,
//              VOLUME=(PRIVATE,RETAIN,SER=&SERIAL1),
//              DISP=(&DISP1),
//              SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//              DSNAME=&PROJECT..DATA.&NEWMSTR
//*
//* OUTPUT DATA SET - SAROAD ADD FILE
//*
//AQSADDFL  DD  UNIT=&UNIT2,
//              VOLUME=SER=&SERIAL2,
//              DISP=(&DISP2),
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=4000),
//              LABEL=(&LABNO1,&LABCK1),
//*             RING=IN,   CHANGE TO USER SPECIFICATIONS
//              DSN=&PROJECT..DATA.&ADDFILE
//*
//* OUTPUT DATA SET - SAROAD CHANGE FILE
//*
//AQSCHGFL  DD  UNIT=&UNIT3,
//              VOLUME=SER=&SERIAL3,
//              DISP=(&DISP3),
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=4000),
//              LABEL=(&LABNO2,&LABCK2),
//*             RING=IN,   CHANGE TO USER SPECIFICATIONS
//              DSN=&PROJECT..DATA.&CHNGEFL
//*
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

(page 2 of 2)

Figure 6.3.2-d continued. Cataloged Procedure AQRPM05

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER would be the full data set name of the AQDHS-II master file
PROGRAM	ARPSARD	AQDHS-II to SAROAD conversion program
OLDMSTR	AQMASTER	Lowest-level index of current AQDHS-II master file
NEWMSTR	AQMSTSNT	Lowest-level index of new AQDHS-II master file
UNIT1	3330	Unit type to which new AQDHS-II master file will be written
UNIT2	2400	Unit type to which SAROAD add file is to be written
UNIT3	2400	Unit type to which SAROAD change file is to be written
SERIAL1	CDHSPK	Volume ID to which new AQDHS-II master file is to be written
SERIAL2	ADDTPE	Volume ID to which SAROAD add file is to be written
SERIAL3	CHGTPE	Volume ID to which SAROAD change file is to be written
DISP1	'NEW,CATLG,DELETE'	Disposition of new AQDHS-II master file
DISP2	'NEW,KEEP'	Disposition of SAROAD add file
DISP3	'NEW,KEEP'	Disposition of SAROAD change file
SPCUNIT	TRK	Units in which space for the new AQDHS-II master file is to be allocated

(Page 1 of 2)

Figure 6.3.2-e. Substitutable Parameters for AQRPM05

Parameter Name	Default Value	Description
PRIMARY	20	Primary space allocation for the new AQDHS-II master file
SECNDRY	10	Secondary space allocation for the new AQDHS-II master file
ADDFILE	ADDFILE	Lowest-level index of SAROAD add file
CHNGEFL	CHNGEFL	Lowest-level index of SAROAD change file
LABNO1	1	Tape sequence order of the SAROAD add file (i.e., the SAROAD add file will be the first data set on the tape)
LABNO2	1	Tape sequence order of the SAROAD change file
LABCK1	BLP	Type of tape labeling for the SAROAD add file
LABCK2	BLP	Type of tape labeling for the SAROAD change file
OUT	A	SYSOUT class for all print files

(Page 2 of 2)

Figure 6.3.2-e - Continued. Substitutable Parameters for AQRPM05

6.4 SUMMARY REPORTS

6.4.1 INTRODUCTION

The AQDHS-II summary reports are reports in which data has been summarized through some type of statistical analysis. This introduction discusses these reports. Following the introduction are detailed discussions of the programs that produce the summary reports.

6.4.1.1 Statistical Reports

AQDHS-II allows the user to produce two statistical reports: the statistical analysis report and the sliding average report. These reports are discussed in Section 5.3.1, statistical analysis.

6.4.1.2 Anomaly Screening Report

The purpose of the anomaly screening report is to identify to the user readings in the master file that are anomalous (irregular) and should be verified by the user. The anomaly screening programs do not delete or alter readings in the master file; it is the user's responsibility to delete or correct any readings identified as anomalous.

Only the following readings are subjected to anomaly screening tests: hourly readings for carbon monoxide, sulfur dioxide, nitrogen dioxide, total oxidants, and ozone; and daily readings for total suspended particulate, sulfur dioxide, and nitrogen dioxide. Hourly readings are subjected to: (1) the maximum value test, which identifies unusually high readings; (2) the adjacent hourly difference test, which identifies pairs of consecutive readings that differ by an unusually large amount; (3) the spike test, which identifies sets of three consecutive readings in which the middle reading is unusually larger or smaller than the other two readings; (4) the modified

Dixon ratio test, which identifies days in which the largest or two largest hourly readings are unusually large in comparison to the other hourly readings in the day; and (5) the gap test, which identifies months of hourly readings that contain significant gaps in the data. Daily readings are subjected to the Shewhart test.

The user should verify all data identified as anomalous in the anomaly screening report. For all tests other than the gap test, the data that fails the tests are printed in the anomaly screening report. For data that fails the gap test, only the key information for the data is printed in the report. Thus, it may be necessary to retrieve and list the data from the master file that fails the gap test. Fortunately, data that fails the gap test usually also fails one of the other tests, thereby causing the anomalous data to be printed in the anomaly screening report.

The anomaly screening flowchart is shown in Figure 6.4.1-a. The anomaly screening master file conversion program, ACVANOM (AQ0040), selects data from the master file that is to be screened, converts it to FORTRAN-compatible format, and passes this data to the anomaly screening report program, ARPANOM (AQ0320). ACVANOM (AQ0040) also performs the gap test and outputs records in the temporary file passed to ARPANOM (AQ0320) to identify those months of data that fail the gap test. ACVANOM (AQ0040) produces a diagnostic report and a new master file. The new master file is a duplicate of the old master file except that the status flags have been changed appropriately (see Figures 5.5.5-b and 5.5.5-c). ARPANOM (AQ0320) performs all anomaly screening tests but the gap test and produces the anomaly screening report, a diagnostic report, and a file of skeleton master file transactions. The skeleton transactions may be used in correcting data that the user determines is incorrect.

Upon each execution of the anomaly screening programs, only data that has been added to or changed in the master file since the last execution of the anomaly screening programs is subjected to the anomaly screening tests.

Detailed discussions of ACVANOM (AQ0040) and ARPANOM (AQ0320) are presented in Sections 5.5.5 and 6.4.3, respectively.

The anomaly screening programs can be executed using the cataloged procedure AQRPM45, which is discussed in Section 6.4.3.5.1. Sample run streams to screen the master file are shown in Section 6.4.3.5.4.

6.4.1.3 Inventory by Site and Inventory by Pollutant Reports

The inventory by site and inventory by pollutant reports summarize data from the master file or an answer file. Data is grouped by site, parameter, year, and time code; the minimum reading, maximum reading, number of readings, and arithmetic mean is computed for each group of data. The inventory by site report is in order by site whereas the inventory by pollutant report is in order by parameter.

The inventory by site and inventory by pollutant report flow charts are shown in Figures 6.4.1-b and 6.4.1-c, respectively. The input master or answer file must be sorted by the master file sort program, ASRMSTR (AQ0140), before either report can be produced. The PARM option is used for the inventory by pollutant report, the SITE option for the inventory by site report. The inventory by site report program, ARPINVS (AQ0280), and the inventory by pollutant report program, ARPINVP (AQ0290), use the sorted master or answer file, the parameter file, and the site file to generate the report. Neither program produces a separate diagnostic report but includes the information normally included in a diagnostic report at the beginning and end of the output report.

Detailed discussions of ARPINVS (AQ0280) and ARPINVP (AQ0290) are presented in Sections 6.4.4 and 6.4.5.

The inventory by site report may be generated using the cataloged procedure AQRPM35, which is discussed in Section 6.4.4.5. A sample run stream to generate an inventory by site report is shown in Section 6.4.4.5.4. The inventory by pollutant report may be generated using the cataloged procedure AQRPM40, which is discussed in Section 6.4.5.5. A sample run stream to generate an inventory by pollutant report is shown in Section 6.4.5.5.4.

6.4.1.4 Master File Summary Report

The master file summary report summarizes data from the master file or an answer file. Data is grouped by site, parameter, and year; the number of readings, number of non-null readings, minimum reading, maximum reading, second and third maximum readings, and arithmetic mean are computed for each group of data.

The master file summary report flowchart is shown in Figure 6.4.1-d. The master file summary report program, ARPMSBR (AQ0300), produces the master file summary report using only the master file or answer file as input. No separate diagnostic report is generated, but the information normally included in a diagnostic report is printed at the beginning and the end of the master file summary report.

A detailed discussion of ARPMSBR (AQ0300) is presented in Section 6.4.6.

ARPMSBR (AQ0300) can be executed using the cataloged procedure AQRPM30, which is discussed in Section 6.4.6.5. A sample run stream to produce a master file summary report is shown in Section 6.4.6.5.4.

6.4.1.5 Parameter Exception and Site Exception Reports

The parameter exception report lists the parameters that occur in the master file or in any answer file but do not exist in the parameter file. The site exception report lists the sites that occur in the master file or in any answer file but do not exist in the site file.

The parameter exception report and site exception report flowcharts are shown in Figures 6.4.1-e and 6.4.1-f, respectively. The parameter exception report program, ARPPMEX (AQ0330), produces the parameter exception report using the master or answer file and the parameter file. The site exception report program, ARPSMEX (AQ0340), produces the site exception report using the master or answer file and the site file. Both programs produce a diagnostic report and skeleton transactions. The skeleton transactions may be used in adding the exceptions to the parameter or site file.

Detailed discussions of ARPPMEX (AQ0330) and ARPSMEX (AQ0340) are presented in Sections 6.4.7 and 6.4.8, respectively.

ARPPMEX (AQ0330) can be executed using the cataloged procedure AQRPP20, which is discussed in Section 6.4.7.5. A sample run stream to generate a parameter exception report is shown in Section 6.4.7.5.4. ARPSMEX (AQ0340) can be executed using the cataloged procedure AQRPS20, which is discussed in Section 6.4.8.5. A sample run stream to generate a site exception report is shown in Section 6.4.8.5.4.

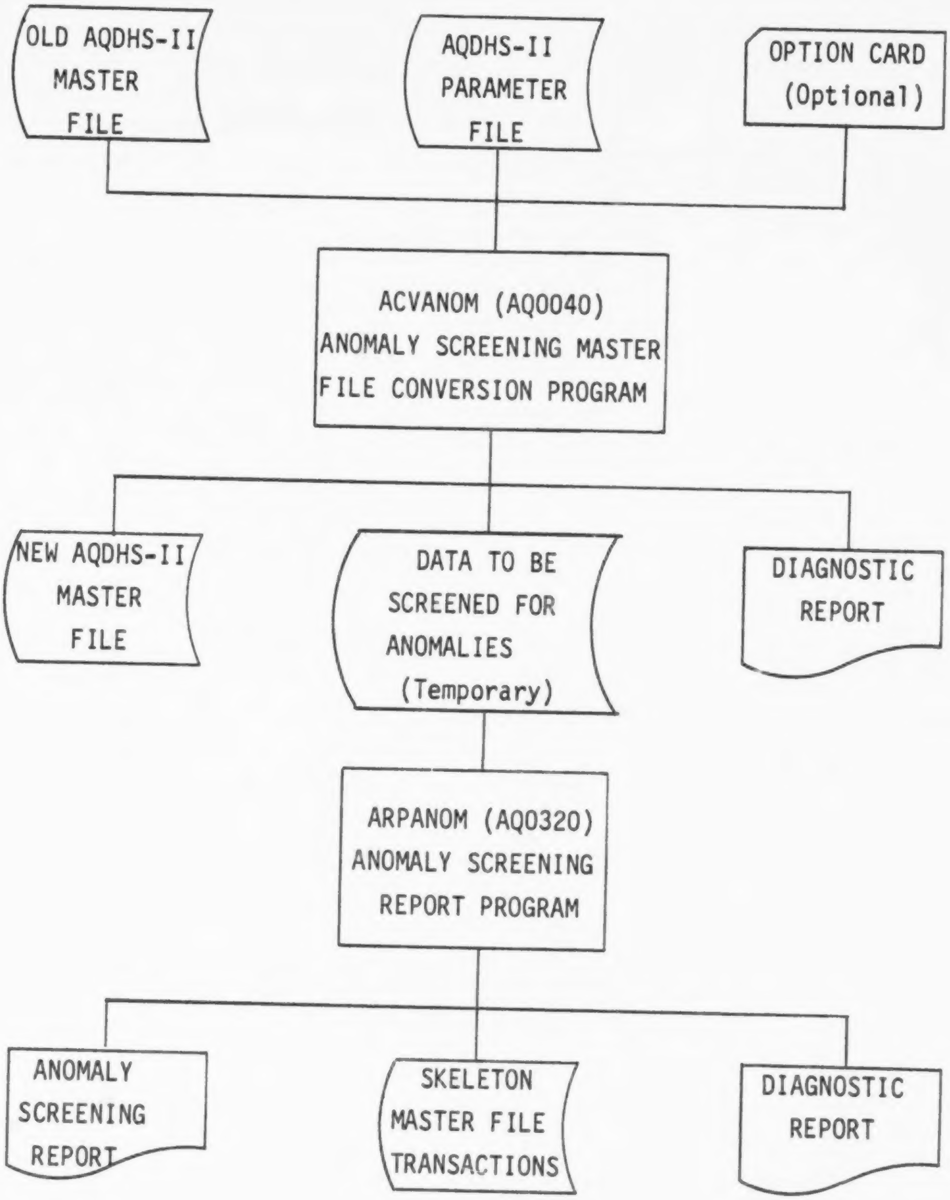

OLD AQDHS-II MASTER FILE
AQDHS-II PARAMETER FILE
OPTION CARD (Optional)
ACVANOM (AQ0040) ANOMALY SCREENING MASTER FILE CONVERSION PROGRAM
NEW AQDHS-II MASTER FILE
DATA TO BE SCREENED FOR ANOMALIES (Temporary)
DIAGNOSTIC REPORT
ARPANOM (AQ0320) ANOMALY SCREENING REPORT PROGRAM
ANOMALY SCREENING REPORT
SKELETON MASTER FILE TRANSACTIONS
DIAGNOSTIC REPORT

Figure 6.4.1-a. Anomaly Screening Flowchart

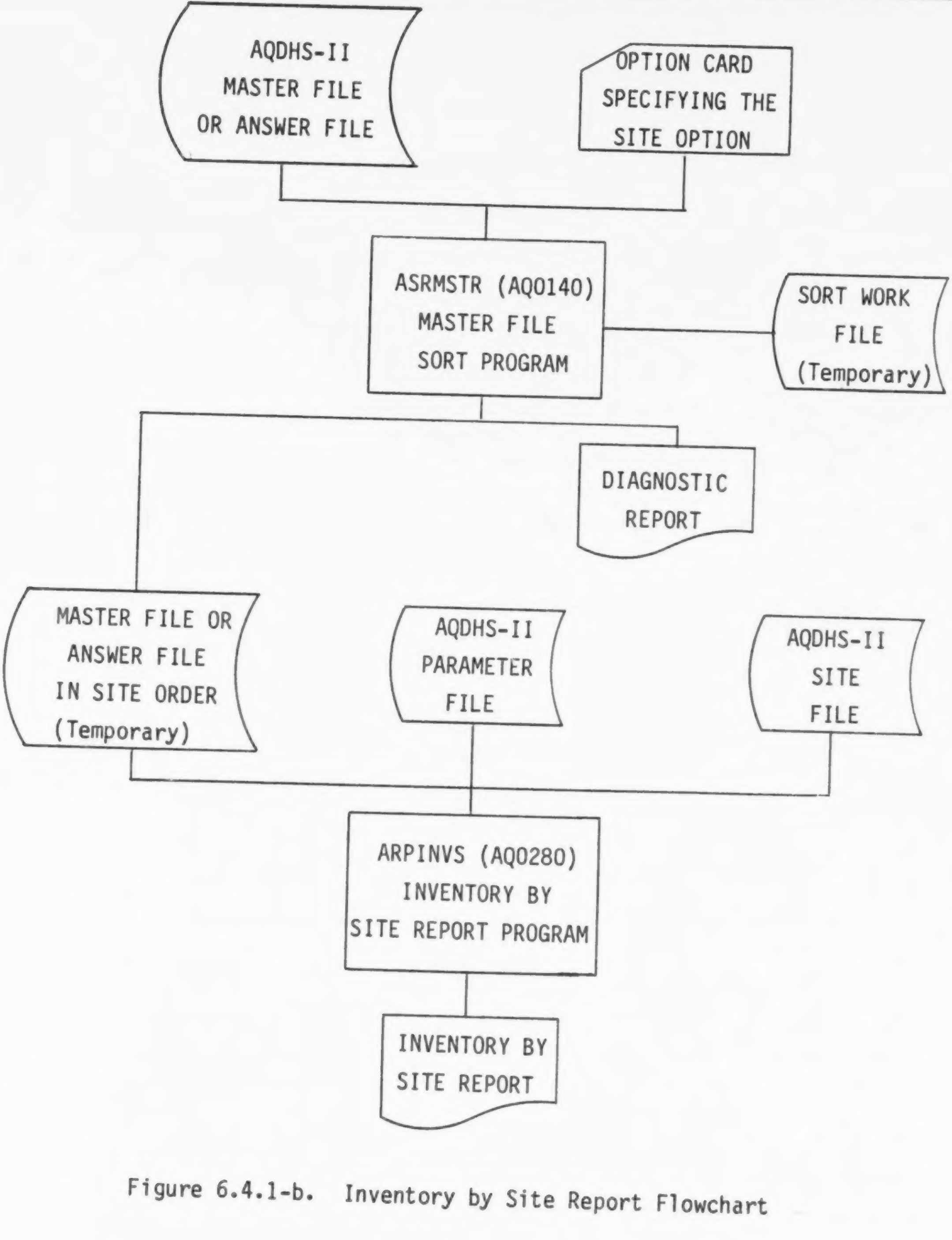

AQDHS-II MASTER FILE OR ANSWER FILE
OPTION CARD SPECIFYING THE SITE OPTION
ASRMSTR (AQ0140) MASTER FILE SORT PROGRAM
SORT WORK FILE (Temporary)
DIAGNOSTIC REPORT
MASTER FILE OR ANSWER FILE IN SITE ORDER (Temporary)
AQDHS-II PARAMETER FILE
AQDHS-II SITE FILE
ARPINVS (AQ0280) INVENTORY BY SITE REPORT PROGRAM
INVENTORY BY SITE REPORT

Figure 6.4.1-b. Inventory by Site Report Flowchart

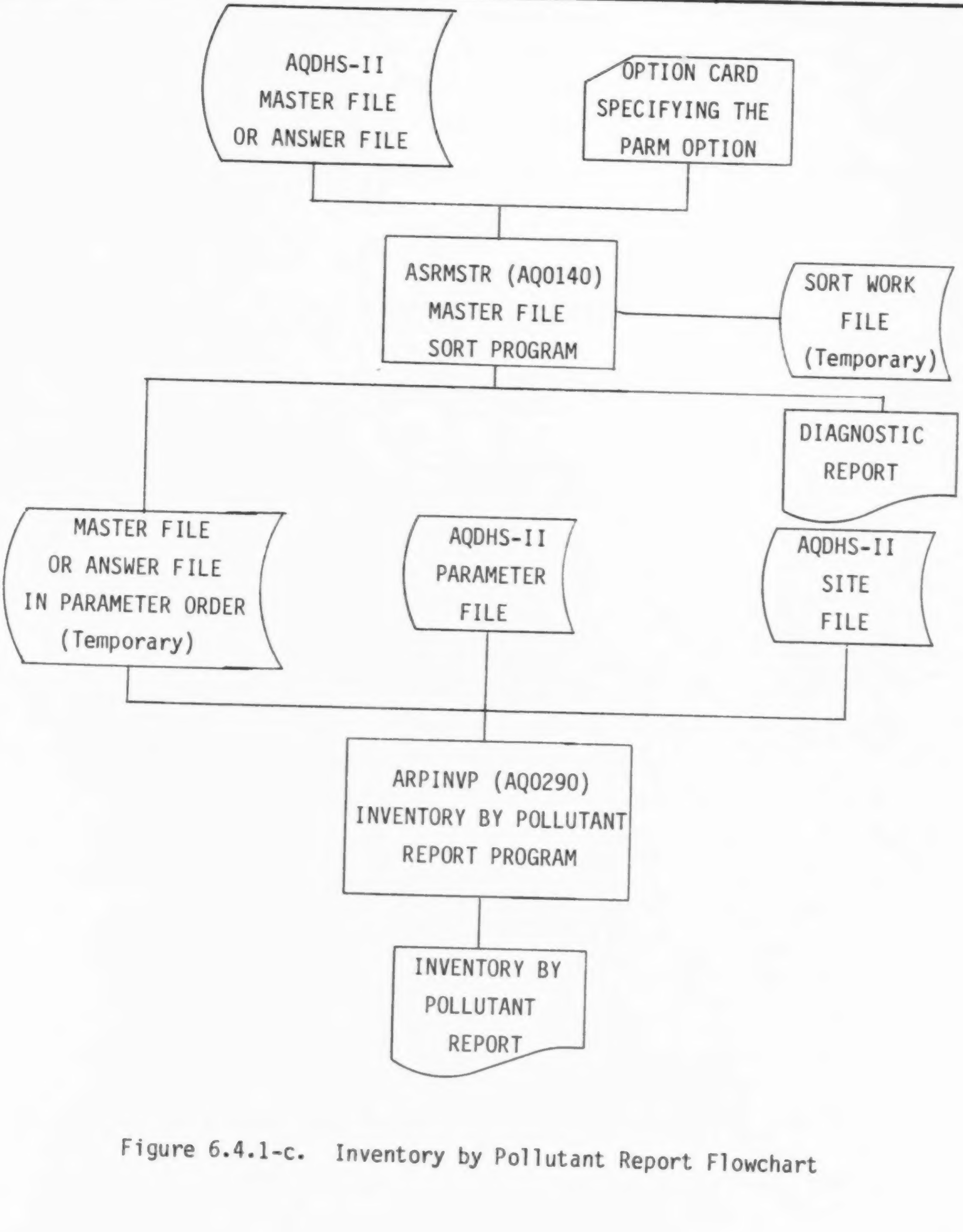

AQDHS-II MASTER FILE OR ANSWER FILE
OPTION CARD SPECIFYING THE PARM OPTION
ASRMSTR (AQ0140) MASTER FILE SORT PROGRAM
SORT WORK FILE (Temporary)
DIAGNOSTIC REPORT
MASTER FILE OR ANSWER FILE IN PARAMETER ORDER (Temporary)
AQDHS-II PARAMETER FILE
AQDHS-II SITE FILE
ARPINVP (AQ0290) INVENTORY BY POLLUTANT REPORT PROGRAM
INVENTORY BY POLLUTANT REPORT

Figure 6.4.1-c. Inventory by Pollutant Report Flowchart

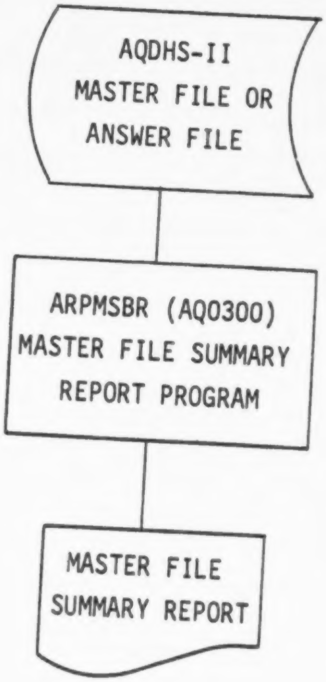


Figure 6.4.1-d. Master File Summary Report Flowchart

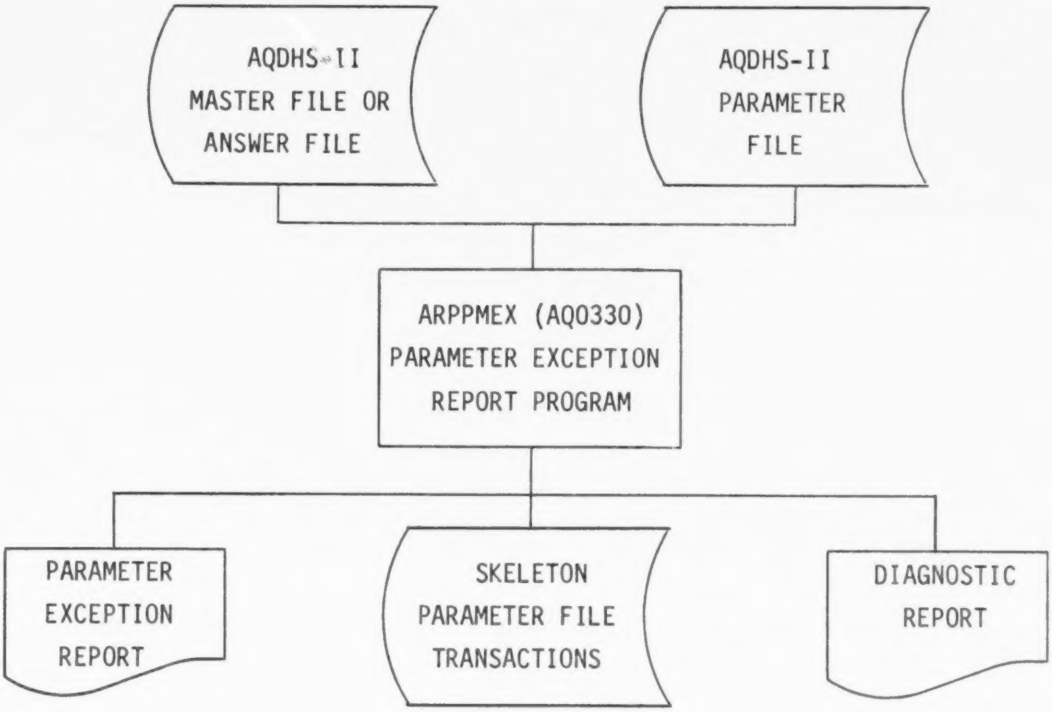


Figure 6.4.1-e. Parameter Exception Report Flowchart

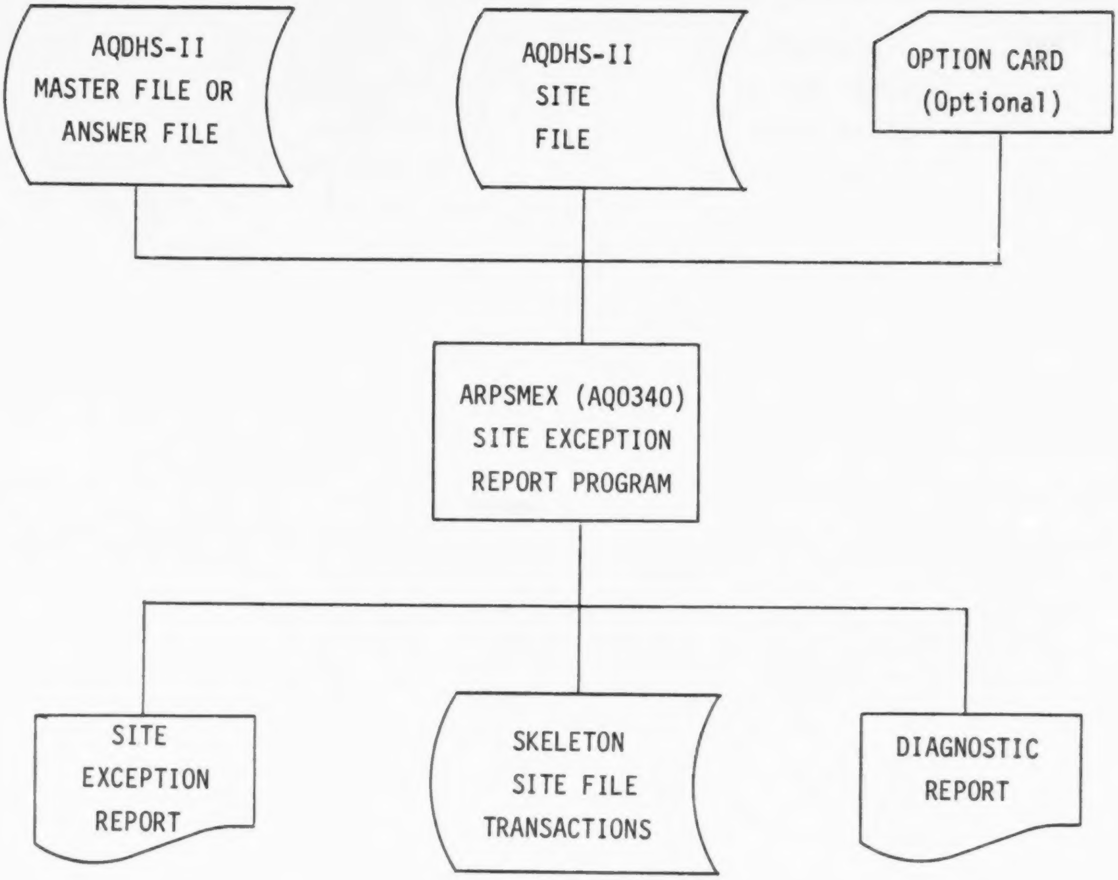


Figure 6.4.1-f. Site Exception Report Flowchart

6.4.2 STATISTICAL REPORT PROGRAM - ARPMSST (AQ0270)

6.4.2.1 Description

ARPMSST (AQ0270) is executed after the preliminary statistics program, ASTPRLM (AQ0190), and the statistical analysis program, ASTMSST (AQ0200), to produce the statistical analysis report which contains the results of the statistical analyses performed by ASTPRLM (AQ0190) and ASTMSST (AQ0200). Note that all three programs must be executed to perform a statistical analysis of an AQDHS-II master or answer file. In addition, some of the options which can be specified for ASTPRLM (AQ0190) require that the master or answer file be sorted by ASRMSTR (AQ0140) prior to performing the statistical analysis. All the statistics for a given time period (either month, quarter, year, or total time period, depending on the option specified in ASTPRLM (AQ0190), within a given site/parameter key data group are printed on one line of the report.

6.4.2.2 File Formats

The primary input file to ARPMSST (AQ0270) is the temporary statistics file created by ASTMSST (AQ0200). Since prose descriptions of the sites and parameters are included in the output report, the site and parameter files auxiliary to the master or answer file which this report describes are also required as input. An option file is the only other input file.

The report itself is the only output file. Column headings for the various statistical items appear at the beginning of each new site block on the report; these headings are separated from the rest of the printed information by dashed lines. Within the site group, each parameter sub-group is distinguished from the others by a two-line heading which indicates the parameter, method of collection and analysis, units, and the time interval at which the readings were collected for that sub-group. Each line within the parameter sub-group is labeled, on the left side, with the time period during which the readings were accumulated. This time period labeling does not occur in the total-time-period statistical report, since there is no break on time time change. Examples of the report produced by ARPMSST (AQ0270) are presented in Figure 6.4.2-a.

6.4.2.3 Options

There are two fields on the option card for ARPMSST (AQ0270). For the format of this option card, see Figure 6.4.2-b. The first option field should contain the page-break option. If this field contains the value FULL, a full page break will occur after each new site is encountered; if it contains the value BRIEF, two dashed lines will be printed to provide the break between lines to allow new column headings and site descriptions to be printed. The examples in Figure 6.4.2-a show statistical analysis reports printed with the FULL option. Figure 6.4.2-c shows a statistical analysis report printed with the BRIEF option.

The second option field should contain the line-maximum option. The two-digit numeric value present in this field specifies the maximum number of lines to be printed per report page.

If the page-break field is blank or invalid, the default option FULL will be in effect. If the line-maximum field is blank or invalid, a maximum of 64 lines per page will be assumed. If no option card is entered, both default values are assumed.

6.4.2.4 Error Messages

ARPMSST 001 ABORT - SITE TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II site file exceeds the limit imposed by the site table in the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 002 ABORT - PARM TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II parameter file exceeds the limit imposed by the parameter table in the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 003 ABORT - STATISTICS FILE EMPTY

Meaning: There are no records in the input statistics file; therefore, no report can be generated.

Action: The problem probably lies with the master or answer file that was input to ASTPRLM (AQ0190). If this file contains no data, a valid master or answer file must be chosen and the four programs - ASRMSTR (AQ0140), ASTPRLM (AQ0190), ASTMSST (AQ0200), and ARPMSST (AQ0270) - rerun.

ARPMSST 004 WARNING - OPTION CARD MISSING: DEFAULT VALUES ARE 64 LINES PER PAGE AND FULL SITE BREAK

Meaning: Because no option card was present in the job stream, the default options were used to generate the statistics report.

Action: None, if the user is satisfied with the format of the report.

ARPMSST 005 WARNING - COLUMN 1 - INVALID OR MISSING SITE BREAK OPTION - FULL BREAK OPTION USED

Meaning: The page-break field on the option card either was left blank or contained a character string other than BRIEF or FULL. The report was generated using the FULL option.

Action: If the BRIEF option is desired, correct the option card and rerun the statistical analysis job stream.

ARPMSST 006 WARNING - COLUMN 7 - INVALID OR MISSING LINE MAXIMUM OPTION - 64 LINES PER PAGE USED

Meaning: The line-maximum field on the option card was either left blank or contained non-numeric characters. The report was generated with a maximum of 64 lines per page.

Action: If a line maximum other than 64 is desired, correct the option card by inserting the desired maximum value in columns seven and eight and rerun the statistical analysis job stream.

ARPMSST 007 ABORT - LEVEL 77 DATA FIELD "SITE-MAX" INCREASED BEYOND SITE-TABLE SIZE

Meaning: A user modification was made to ARPMSST (AQ0270) to change the capacity of the site table. However, only one of the two required line changes was made. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 008 ABORT - LEVEL 77 DATA FIELD "PARM-MAX" INCREASED BEYOND PARM-TABLE SIZE

Meaning: A user modification was made to ARPMSST (AQ0270) to change the capacity of the parameter table. However, only one of the two required line changes was made. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

6.4.2.5 Cataloged JCL

6.4.2.5.1 JCL listing - ARPMSST (AQ0270) can be run by executing the cataloged procedure AQRPM10. This procedure also executes the preliminary statistics program, ASTPRLM (AQ0190), and the statistical analysis program, ASTMSST (AQ0200). See Figure 6.4.2-d for a listing of this procedure.

6.4.2.5.2 Cross-reference of DD names and files

Program Name: ASTPRLM (AQ0190)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSPARMC	AQDHS-II parameter file	Input
AQSOPTIN	Option card	Input
AQSENTNL	FORTRAN-compatible data file passed to ASTMSST (AQ0200)	Output
AQSSTATS	FORTRAN-compatible statistics file passed to ASTMSST (AQ0200)	Output
AQSPRINT	Diagnostic report	Output

Program Name: ASTMSST (AQ0200)

DD Name	FORTRAN Unit Number	File Description	Input/Output
FT07F001	7	Statistics file from ASTPRLM (AQ0190)	Input
FT08F001	8	Data file from ASTPRLM (AQ0190)	Input

Program Name: ASTMSST (AQ0200) - Continued.

DD Name	FORTRAN Unit Number	File Description	Input/Output
FT09F001	9	Statistics file passed to ARPMSST (AQ0270)	Output
FT06F001	6	Diagnostic report	Output

Program Name: ARPMSST (AQ0270)

DD Name	File Description	Input/Output
AQSTATIS	Statistics file from ASTMSST (AQ0200)	Input
AQSPARMS	AQDHS-II parameter file	Input
AQSSITES	AQDHS-II site file	Input
AQSOPTIN	Option card	Input
AQSPRINT	AQDHS-II statistical analysis report	Output

6.4.2.5.3 User-supplied JCL - Two option cards can be included in the job stream when executing the statistical analysis procedure AQRPM10. The first option card occurs in the step 'PRELIM' which executes ASTPRLM (AQ0190). See Section 5.3.2.3 for a description of the format and possible values of this option card. The second option card is in the step PRINTS which executes ARPMSST (AQ0270). See Section 6.4.2.3 for a description of the format and valid options of this card. In addition, the user must specify the data set names of the master, parameter, and site files. See Figure 6.4.2-e for a description of the procedure's substitutable parameters.

6.4.2.5.4 Sample run streams -The first run stream shown produces a statistical report of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ONLY1977' (Assume this file contains only data from the calendar year 1977.) A monthly analysis period is chosen, and the report is formatted with the FULL page-break option and a line-maximum of 55 lines per page. Note that the master file does not need to be pre-sorted because it contains only one year's worth of data.

```
//  EXEC  AQRPM10,
//        MSTRFIL=ONLY1977,
//        PARMFIL=PARM77,
//        SITEFIL=SITE77
//PRELIM.OPTIONS DD *
MONTH
/*
//PRINTS.OPTIONS DD *
FULL  55
/*
```

The second sample run stream produces a statistical report of the AQDHS-II master file 'CN.EPALMH.1087.CDHS.HQ.AQS.DATA.ALL1970S'. A yearly analysis period is chosen, and the report format incorporates the BRIEF page-break option and the default line-maximum of 64 lines per page. Because the master file contains data for more than one year, a pre-sort is used; the run stream includes this pre-sort (procedure AQSRM10 executing ASRMSTR (AQ0140) with the STAT option).

```
//  EXEC  AQSRM10,
//        MSTRFIL=ALL1970S,
//        SORTFIL=SRT1970S
//SORT.OPTIONS DD *
```

```
STAT
/*
// EXEC  AQRPM10,
//       MSTRFIL=SRT1970S,
//       PARMFIL=PARM70S,
//       SITEFIL=SITE70S
//PRELIM.OPTIONS DD *
YEAR
/*
//PRINTS.OPTIONS DD *
BRIEF
/*
```

The last run stream produces another statistical report of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ALL1970S'. No option card is present for the preliminary statistics program, so the default option TOTAL is used. No report format option card is present, so the page-break and line-maximum default options of FULL and 64 lines per page are used. Since the total-time-period option is used on a multi-year file, the master file pre-sort is required.

```
// EXEC  AQSRM10,
//       MSTRFIL=ALL1970S,
//       SORTFIL=SRT1970S
//SORT.OPTIONS DD *
STAT
/*
// EXEC  AQRPM10,
//       MSTRFIL=SRT1970S,
//       PARMFIL=PARM70S,
//       SITEFIL=SITE70S
```

6.4.2.6 Warnings and Special Instructions

The preceding sample run streams demonstrate the master file sorting requirements for different combinations of file content and analysis period. To produce a more meaningful statistical report, any master file which contains more than one calendar year's worth of data should be pre-sorted.

Output files from the sort program, the preliminary statistics program, and the statistical analysis program are set up in the procedures as temporary files. Therefore, the entire statistical analysis procedure (including the pre-sort, if needed) must be rerun to regenerate the report.

6.4.2.7 Cost Considerations

The following estimates are for the execution of ARPMSST (AQ0270) on an IBM 370/168:

Number of input records:	360 records
Number of report pages:	18 pages
CPU time:	1.7 seconds
I/O time:	5.0 seconds
Total time:	6.7 seconds
Estimated cost:	$1.47

6.4.2.8 Related Programs and Procedures

Programs that are executed with ARPMSST (AQ0270) in the statistical analysis procedure, AQRPM10, include the preliminary statistics program ASTPRLM (AQ0190) (see Section 5.3.2) and the statistical analysis program ASTMSST (AQ0200) (see Section 5.3.3). The master file sort program ASRMSTR (AQ0140) is discussed in Section 5.6.2; the procedure that invokes the master file sort program is AQSRM10.

```
                    AQDHS-II STATISTICAL ANALYSIS REPORT PROGRAM  -  DIAGNOSTIC REPORT                               PAGE      1
PROGRAM-NAME: ARPMSST (AQ0270)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

OPTION CARD IMAGE:         60
                                    *** ARPMSST 005 WARNING - COLUMN 1 - INVALID OR MISSING SITE BREAK OPTION - FULL BREAK OPTION USED
PRINTING OPTIONS CHOSEN ARE FULL  SITE BREAK AND 60 LINES PER PAGE
```

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Figure 6.4.2-a. Examples of the Statistical Analysis Report with Full Option

```
                                        AQDHS-II STATISTICAL ANALYSIS REPORT                                      PAGE     7
                                              ANALYSIS BY MONTH
                                          STATE (34): NORTH CAROLINA
SITE CODE: 34-0001-004-A-06       AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE   COUNTY(2980)
AGENCY/PROJECT: A06                                         SITE ADDR: GUM BRANCH RD., JACKSONVILLE, ONSLOW CO.
-----------------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                  METHOD OF COLLECTION AND ANALYSIS
POLLUTANT-METHOD-INTERVAL-UNITS CODE                                                   INTERVAL    UNITS
         PCT   NBR   MIN    MIN                                                                                        TIMES
YR/MON   OBS   OBS   DETEC  OBS      10    30    50    70    90    95    99    MAX    2ND    3RD    ARIT   ARIT    GEOM   GEOM   HALF
                                                PERCENTILES                   OBS    MAX    MAX    MEAN   ST DEV  MEAN   ST DEV M DET
                                                                                                                               SUB
-----------------------------------------------------------------------------------------------------------------------------
TOTAL SUSPENDED PARTICULATE     HI-VOL                   - GRAVIMETRIC                  DAILY      U-GMS/M3 (25DEG C,1013 M-BARS)
11101-91-8-01
76/10  16.1     5  1.000 31.00    31.   43.   45.   62.   63.   63.   63.  63.00  62.00  45.00  48.80  13.60   47.20  1.341     0
76/11  13.3     4  1.000 6.000     6.   39.   39.   62.  124.  124.  124.  124.0  62.00  39.00  57.75  49.78   36.62  3.655     0
76/12  16.1     5  1.000 30.00    30.   34.   53.   71.   81.   81.   81.  81.00  71.00  53.00  53.80  22.33   49.94  1.550     0
77/01  12.9     4  1.000 0.0       0.   25.   25.   35.  964.  964.  964.  964.0  35.00  25.00  256.0  472.2   25.48  22.10     1
77/02  85.7    24  1.000 65.00   455.  455.  455.  455.  455.  455.  455.  455.0  455.0  455.0  424.7  102.7   396.7  1.604     0

SULFUR DIOXIDE                  GAS BUBBLER              - PARAROSANILINE-SULFAMIC      DAILY      U-GMS/M3 (25 DEG C,1013 M-BARS
42401-91-8-01
76/07  16.1     5  5.000 0.0       0.    0.    0.    0.   28.   28.   28.  28.00  0.0    0.0    5.600  12.52   4.053  2.945     4

OXIDES OF NITROGEN              GAS BUBBLER              - SALTZMAN METHOD              MONTHLY    PARTS PER MILLION (VOL/VOL)
42603-99-A-07
73/01 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/02 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/03 100.0     1  0.002 0.099  0.099 0.099 0.099 0.099 0.099 0.099 0.099  0.099   N/A    N/A   0.099  0.0     0.099  1.000     0
73/04 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/05 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/06 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/07 100.0     1  0.002 0.099  0.099 0.099 0.099 0.099 0.099 0.099 0.099  0.099   N/A    N/A   0.099  0.0     0.099  1.000     0
73/08 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/09 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/10 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/11 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
73/12 100.0     1  0.002 0.002  0.002 0.002 0.002 0.002 0.002 0.002 0.002  0.002   N/A    N/A   0.002  0.0     0.001  1.000     1
```

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Figure 6.4.2-a - continued. Examples of the Statistical Analysis Report with Full Option

```
                                          AQDHS-II STATISTICAL ANALYSIS REPORT                                    PAGE    3
                                                ANALYSIS BY QUARTER
                                             STATE (34): NORTH CAROLINA
SITE CODE: 34-0001-001-A-06        AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE    COUNTY(0960)
AGENCY/PROJECT: A06                                              SITE ADDR: YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.
-------------------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                      METHOD OF COLLECTION AND ANALYSIS
POLLUTANT-METHOD-INTERVAL-UNITS CODE                                                       INTERVAL     UNITS
         PCT   NBR   MIN    MIN                                                                                               TIMES
YR/QTR   OBS   OBS   DETEC  OBS                  PERCENTILES                    MAX    2ND     3RD    ARIT   ARIT     GEOM   GEOM   HALF
                                      10    30    50    70    90    95    99    OBS    MAX     MAX    MEAN   ST DEV   MEAN   ST DEV M DET
                                                                                                                                SUB
-------------------------------------------------------------------------------------------------------------------------------
SULFUR DIOXIDE                      DAVIS INSTRUMENT         - HYDROGEN PEROXIDE           HOURLY     U-GMS/M3 (25DEG C,1013 M-BARS)
42401-31-1-01
 79/1    0.1     3  26.20 37.00     37.   37.   37. 9928. 9928. 9928. 9928.  9928.  37.00  37.00   3334.  5710.   238.6  25.24     0

OXIDES OF NITROGEN                  INSTRUMENTAL             - CHEMILUMINESCENCE           12 HOURS    PARTS PER MILLION (VOL/VOL)
42603-14-7-07
 79/1   12.2    22  0.010 0.010     0.01  0.03  0.05  0.21  0.37  0.41  0.41  0.410  0.410  0.370   0.141  0.153   0.065  3.944     0
```

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Figure 6.4.2-a - continued. Examples of the Statistical Analysis Report with Full Option

```
                                                AQDHS-II STATISTICAL ANALYSIS REPORT                                  PAGE     1
                                                    ANALYSIS FOR TOTAL TIME PERIOD
                                                     STATE (34): NORTH CAROLINA

SITE CODE: 34-0001-004-A-06       AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE   COUNTY(2980)
AGENCY/PROJECT: A06                                         SITE ADDR: GUM BRANCH RD., JACKSONVILLE, ONSLOW CO.

-------------------------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                   METHOD OF COLLECTION AND ANALYSIS                      INTERVAL    UNITS                      TIME:
POLLUTANT-METHOD-INTERVAL-UNITS CODE     SAMPLING DATES                                                                         HALF
        PCT   NBR   MIN     MIN                  PERCENTILES                 MAX    2ND   3RD     ARIT   ARIT    GEOM    GEOM   M DEI
        OBS   OBS  DETEC    OBS    10    30    50    70    90    95    99    OBS    MAX   MAX     MEAN  ST DEV   MEAN   ST DEV  SUM
-------------------------------------------------------------------------------------------------------------------------------------
TOTAL SUSPENDED PARTICULATE      HI-VOL                   - GRAVIMETRIC                 DAILY       U-GMS/M3 (25DEG C,1013 M-BARS)
11101-91-8-01                            10/01/76 TO 12/31/76
       15.2    14  1,000 6,000   30.   39.   45.   62.   81.  124.  124.  124.0  81.00  71.00   53.14  28.22   44.79  2.016       0

SULFUR DIOXIDE                   GAS BUBBLER              - PARAROSANILINE-SULFAMIC     DAILY       U-GMS/M3 (25 DEG C,1013 M-BARS
42401-91-8-01                            07/01/76 TO 07/31/76
       16.1     5  5,000 0.0      0.    0.    0.    0.   28.   28.   28.  28.00  0.0    0.0     5.600  12.52   4.053  2.945       4

TOTAL SUSPENDED PARTICULATE      HI-VOL                   - GRAVIMETRIC                 DAILY       U-GMS/M3 (25DEG C,1013 M-BARS)
11101-91-8-01                            01/01/77 TO 02/28/77
       47.5    28  1,000 0.0     35.  455.  455.  455.  455.  455.  964.  964.0  455.0  455.0   400.6  193.3   268.0  4.425       1
```

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Figure 6.4.2-a - continued. Examples of the Statistical Analysis Report with Full Option

```
                                  ARPMSST (AQ0200) SUMMARY MESSAGES                                        PAGE    1
NUMBER OF INPUT RECORDS:                    12
NUMBER OF ERRORS:                            1
NUMBER OF OUTPUT PAGES:                      3

PROGRAM-NAME: ARPMSST (AQ0270)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

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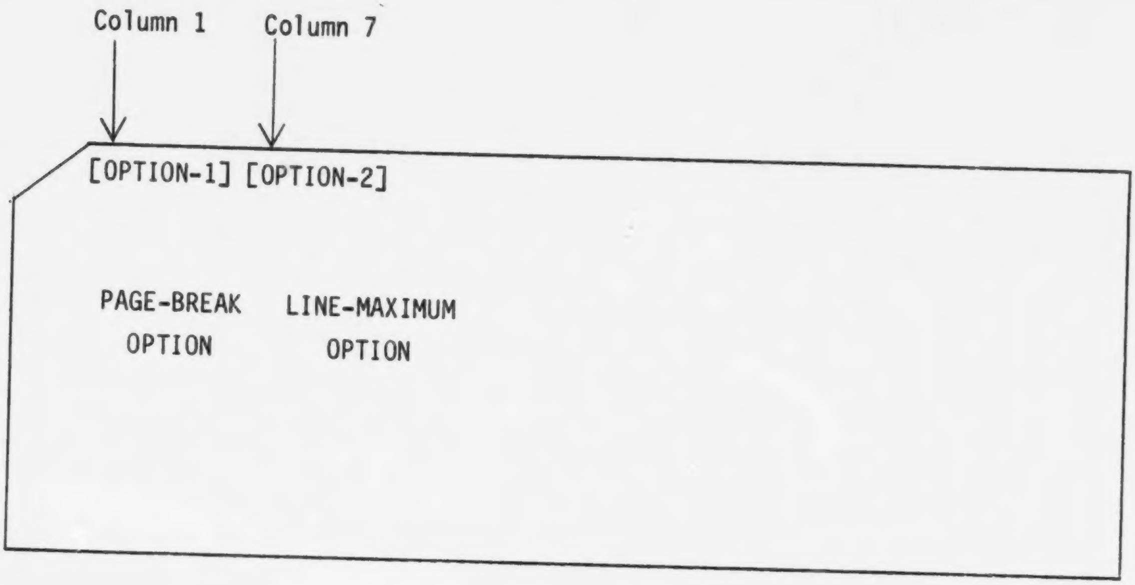
Figure 6.4.2-a - continued. Examples of the Statistical Analysis Report with Full Option

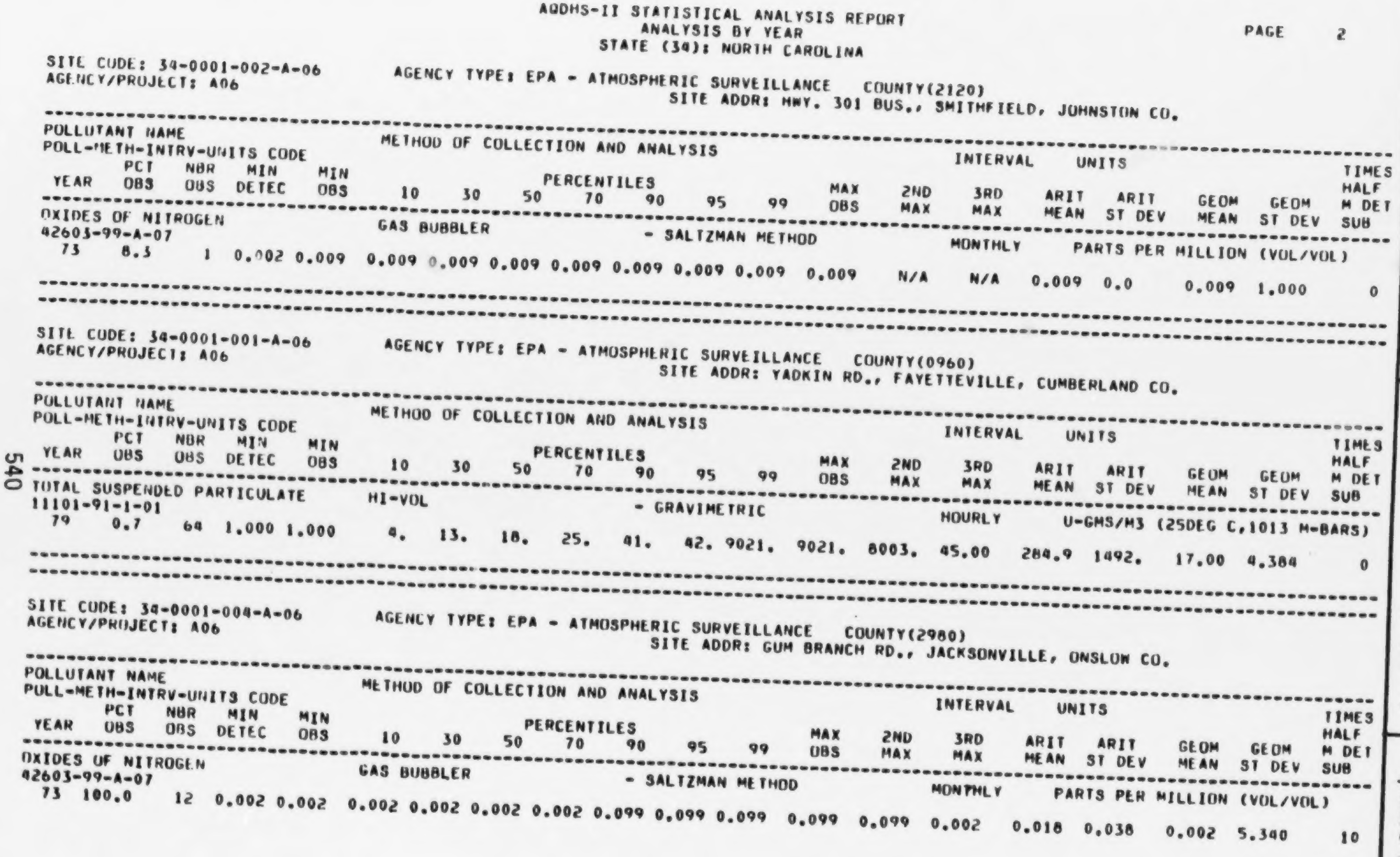


The content of the option card for the statistical report option card is subject to the following restrictions:

1. The page-break option, if present, must begin in column 1. The only valid values are BRIEF or FULL.

2. The line-maximum option, if present, must be a two-digit number and begin in column 7.

Figure 6.4.2-b. Option Card Format



```
                                   AQDHS-II STATISTICAL ANALYSIS REPORT
                                            ANALYSIS BY YEAR                                                    PAGE    2
                                        STATE (34): NORTH CAROLINA
SITE CODE: 34-0001-002-A-06       AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE   COUNTY(2120)
AGENCY/PROJECT: A06                                       SITE ADDR: HWY. 301 BUS., SMITHFIELD, JOHNSTON CO.
----------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                  METHOD OF COLLECTION AND ANALYSIS
POLL-METH-INTRV-UNITS CODE                                                          INTERVAL    UNITS
       PCT   NBR   MIN     MIN                                                                                        TIMES
 YEAR  OBS   OBS  DETEC    OBS                PERCENTILES                 MAX    2ND    3RD    ARIT   ARIT    GEOM   GEOM   HALF
                                 10    30    50    70    90    95    99   OBS    MAX    MAX    MEAN  ST DEV   MEAN  ST DEV  M DET
----------------------------------------------------------------------------------------------------------------------  SUB
OXIDES OF NITROGEN              GAS BUBBLER
42603-99-A-07                                     - SALTZMAN METHOD                      MONTHLY     PARTS PER MILLION (VOL/VOL)
  73    8.3     1  0.002 0.009  0.009 0.009 0.009 0.009 0.009 0.009 0.009  0.009    N/A    N/A   0.009  0.0     0.009  1.000     0
----------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------
SITE CODE: 34-0001-001-A-06       AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE   COUNTY(0960)
AGENCY/PROJECT: A06                                       SITE ADDR: YADKIN RD., FAYETTEVILLE, CUMBERLAND CO.
----------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                  METHOD OF COLLECTION AND ANALYSIS
POLL-METH-INTRV-UNITS CODE                                                          INTERVAL    UNITS
       PCT   NBR   MIN     MIN                                                                                        TIMES
 YEAR  OBS   OBS  DETEC    OBS                PERCENTILES                 MAX    2ND    3RD    ARIT   ARIT    GEOM   GEOM   HALF
                                 10    30    50    70    90    95    99   OBS    MAX    MAX    MEAN  ST DEV   MEAN  ST DEV  M DET
----------------------------------------------------------------------------------------------------------------------  SUB
TOTAL SUSPENDED PARTICULATE     HI-VOL
11101-91-1-01                                     - GRAVIMETRIC                          HOURLY      U-GMS/M3 (25DEG C,1013 M-BARS)
  79    0.7    64  1.000 1.000    4.   13.   18.   25.   41.   42. 9021.  9021.  8003.  45.00   284.9  1492.   17.00  4.384     0
----------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------------------------
SITE CODE: 34-0001-004-A-06       AGENCY TYPE: EPA - ATMOSPHERIC SURVEILLANCE   COUNTY(2980)
AGENCY/PROJECT: A06                                       SITE ADDR: GUM BRANCH RD., JACKSONVILLE, ONSLOW CO.
----------------------------------------------------------------------------------------------------------------------
POLLUTANT NAME                  METHOD OF COLLECTION AND ANALYSIS
POLL-METH-INTRV-UNITS CODE                                                          INTERVAL    UNITS
       PCT   NBR   MIN     MIN                                                                                        TIMES
 YEAR  OBS   OBS  DETEC    OBS                PERCENTILES                 MAX    2ND    3RD    ARIT   ARIT    GEOM   GEOM   HALF
                                 10    30    50    70    90    95    99   OBS    MAX    MAX    MEAN  ST DEV   MEAN  ST DEV  M DET
----------------------------------------------------------------------------------------------------------------------  SUB
OXIDES OF NITROGEN              GAS BUBBLER
42603-99-A-07                                     - SALTZMAN METHOD                      MONTHLY     PARTS PER MILLION (VOL/VOL)
  73  100.0    12  0.002 0.002  0.002 0.002 0.002 0.002 0.099 0.099 0.099  0.099  0.099  0.002  0.018  0.038   0.002  5.340    10
```

Figure 6.4.2-c. Example of Statistical Analysis Report with Brief Option

```
//*
//*    PROCEDURE NAME: AQRPM10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 25
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO GENERATE A STATISTICAL ANALYSIS
//*    REPORT
//*
//*
//AQRPM10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROG1=ASTPRLM,
//             PROG2=ASTMSST,
//             PROG3=ARPMSST,
//             MSTRFIL=AQMSTSRT,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             SPCUNT1=TRK,
//             SPCUNT2=TRK,
//             PRI1=20,
//             SEC1=10,
//             PRI2=20,
//             SEC2=10,
//             BLKSIZE=1300,
//             TIME1='1,0',
//             TIME2='1,0',
//             TIME3='1,0',
//             OUT=A
//*
//PRELIM    EXEC PGM=&PROG1,
//             TIME=(&TIME1)
//*
//* PREFORM PRELIMINARY STATISTICAL ANALYSIS
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - PARAMETER FILE
//*
//AQSPARMC  DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - OPTIONS CONTROL CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - FORTRAN-COMPATIBLE FILE CONTAINING
```

(page 1 of 4)

Figure 6.4.2-d. Cataloged Procedure AQRPM10

```
//*                      ABBREVIATED MASTER FILE RECORDS                00005900
//*                                                                     00006000
//AQSRDATA  DD UNIT=SYSDA,                                              00006100
//              DISP=(NEW,PASS,DELETE),                                 00006200
//              SPACE=(&SPCUNT1,(&PRI1,&SEC1),RLSE),                    00006300
//              DSNAME=&&DATAFIL                                        00006400
//*                                                                     00006500
//* OUTPUT DATA SET - FORTRAN-COMPATIBLE STATISTICS FILE                00006600
//*                                                                     00006700
//AQSSTATS  DD UNIT=SYSDA,                                              00006800
//              DISP=(NEW,PASS,DELETE),                                 00006900
//              SPACE=(&SPCUNT1,(&PRI1,&SEC1),RLSE),                    00007000
//              DSNAME=&&STATFIL                                        00007100
//*                                                                     00007200
//* OUTPUT DATA SET - MESSAGE LISTING                                   00007300
//*                                                                     00007400
//AQSPRINT  DD SYSOUT=&OUT                                              00007500
//*                                                                     00007600
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00007700
//*                                                                     00007800
//SYSPRINT  DD SYSOUT=&OUT                                              00007900
//*                                                                     00008000
//SYSOUT    DD SYSOUT=&OUT                                              00008100
//*                                                                     00008200
//SYSDBOUT  DD SYSOUT=&OUT                                              00008300
//*                                                                     00008400
//SYSDTERM  DD SYSOUT=&OUT                                              00008500
//*                                                                     00008600
//SYSUDUMP  DD SYSOUT=&OUT                                              00008700
//*                                                                     00008800
//ANALYZE EXEC PGM=&PROG2,                                              00008900
//              REGION=100K,                                            00009000
//              TIME=(&TIME2)                                           00009100
//*                                                                     00009200
//* PERFORM STATISTICAL ANALYSIS OF READINGS IN MASTER FILE             00009300
//*                                                                     00009400
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00009500
//              VOLUME=(PRIVATE,RETAIN),                                00009600
//              DISP=(SHR,PASS)                                         00009700
//*                                                                     00009800
//* INPUT DATA SET - STAT FILE FROM ASTPRLM                             00009900
//*                                                                     00010000
//FT07F001  DD DSNAME=&&STATFIL,                                        00010100
//              DISP=(SHR,DELETE,DELETE)                                00010200
//*                                                                     00010300
//* INPUT DATA SET - DATA FILE FROM ASTPRLM                             00010400
//*                                                                     00010500
//FT08F001  DD DSNAME=&&DATAFIL,                                        00010600
//              VOLUME=(PRIVATE,RETAIN),                                00010700
//              DISP=(SHR,DELETE,DELETE)                                00010800
//*                                                                     00010900
//* OUTPUT DATA SET - STATISTICS FILE                                   00011000
//*                                                                     00011100
//FT09F001  DD UNIT=SYSDA,                                              00011200
//              DISP=(NEW,PASS,DELETE),                                 00011300
//              SPACE=(&SPCUNT2,(&PRI2,&SEC2),RLSE),                    00011400
//              DSNAME=&&STATOUT,                                       00011500
//              DCB=(RECFM=FB,LRECL=100,BLKSIZE=&BLKSIZE)               00011600
```

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Figure 6.4.2-d - Continued. Cataloged Procedure AQRPM10

```
//*                                                                     00011700
//* OUTPUT DATA SET - DIAGNOSTIC MESSAGES                               00011800
//*                                                                     00011900
//FT06F001  DD SYSOUT=&OUT                                              00012000
//*                                                                     00012100
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00012200
//*                                                                     00012300
//SYSPRINT  DD SYSOUT=&OUT                                              00012400
//*                                                                     00012500
//SYSUDUMP  DD SYSOUT=&OUT                                              00012600
//*                                                                     00012700
//FT03F001  DD SYSOUT=&OUT                                              00012800
//*                                                                     00012900
//PRINTS EXEC PGM=&PROG3,                                               00013000
//             REGION=150K,                                             00013100
//             TIME=(&TIME3)                                            00013200
//*                                                                     00013300
//* LIST DATA ANALYSIS STATISTICS FILE                                  00013400
//*                                                                     00013500
//STEPLIB   DD DSNAME=&PROJECT..LOAD,                                   00013600
//             VOLUME=(PRIVATE,RETAIN),                                 00013700
//             DISP=(SHR,PASS)                                          00013800
//          DD DSNAME=SYS1.COBLIB,                                      00013900
//             DISP=(SHR,PASS)                                          00014000
//*                                                                     00014100
//* INPUT DATA SET - STATISTICS FILE FROM ASTMSST                       00014200
//*                                                                     00014300
//AQSTATIS  DD DSNAME=&&STATOUT,                                        00014400
//             DISP=(SHR,DELETE,DELETE)                                 00014500
//*                                                                     00014600
//* INPUT DATA SET - PARAMETER FILE                                     00014700
//*                                                                     00014800
//AQSPARMS  DD DSNAME=&PROJECT..DATA.&PARMFIL,                          00014900
//             VOLUME=(PRIVATE,RETAIN),                                 00015000
//             DISP=(SHR,PASS)                                          00015100
//*                                                                     00015200
//* INPUT DATA SET - SITE FILE                                          00015300
//*                                                                     00015400
//AQSSITES  DD DSNAME=&PROJECT..DATA.&SITEFIL,                          00015500
//             VOLUME=(PRIVATE,RETAIN),                                 00015600
//             DISP=(SHR,PASS)                                          00015700
//*                                                                     00015800
//* INPUT DATA SET - CONTROL CARD                                       00015900
//*                                                                     00016000
//AQSOPTIN  DD DDNAME=OPTIONS,                                          00016100
//             DCB=BLKSIZE=80                                           00016200
//*                                                                     00016300
//* OUTPUT DATA SET - STATISTICAL ANALSIS REPORT                        00016400
//*                                                                     00016500
//AQSPRINT  DD SYSOUT=&OUT                                              00016600
//*                                                                     00016700
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00016800
//*                                                                     00016900
//SYSPRINT  DD SYSOUT=&OUT                                              00017000
//*                                                                     00017100
//SYSOUT    DD SYSOUT=&OUT                                              00017200
//*                                                                     00017300
//SYSDBOUT  DD SYSOUT=&OUT                                              00017400
```

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Figure 6.4.2-d - Continued. Cataloged Procedure AQRPM10

```
//*                                                                     00017500
//SYSDTERM  DD SYSOUT=&OUT                                              00017600
//*                                                                     00017700
//SYSUDUMP  DD SYSOUT=&OUT                                              00017800
//*                                                                     00017900
```

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Figure 6.4.2-d - Continued. Cataloged Procedure AQRPM10

Parameter Name	Default Name	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TOTAL is the full data set name of the waste file)
PROG1	ASTPRLM	Preliminary statistics program
PROG2	ASTMSST	Statistical analysis program
PROG3	ARPMSST	Statistical report program
MSTRFIL	TESTFM1	Lowest-level index of master file input to ASTPRLM
PARMFIL	HTPARMAA	Lowest-level index of parameter file
SITEFIL	HTSITEAA	Lowest-level index of site file
SPCUNT1	TRK	Units in which space for temporary output files from ASTPRLM is to be allocated
SPCUNT2	TRK	Units in which space for temporary output file from ASTMSST is to be allocated
PRI1	20	Primary space allocation for each temporary output file from ASTPRLM
SEC1	10	Secondary space allocation for each temporary output file from ASTPRLM
PRI2	20	Primary space allocation for temporary output file from ASTMSST
SEC2	10	Secondary space allocation for temporary output file from ASTMSST

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Figure 6.4.2-e. Substitutable Parameters for AQRPM10

Parameter Name	Default Name	Description
BLKSIZE	4000	Block size for output statistics file from ASTMSST
TIME1	'1,0'	Time allowed to execute ASTPRLM
TIME2	'1,0'	Time allowed to execute ASTMSST
TIME3	'1,0'	Time allowed to execute ARPMSST
OUT	A	SYSOUT class for all print files

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Figure 6.4.2-e - Continued. Substitutable Parameters for AQRPM10

6.4.3 ANOMALY SCREENING REPORT PROGRAM - ARPANOM (AQ0320)

6.4.3.1 Description

The anomaly screening report program, ARPANOM (AQ0320), is the second of two programs used to screen the AQDHS-II master file for values that are anomalous and are, therefore, potentially in error. ARPANOM (AQ0320) is executed after the anomaly screening master file conversion program, ACVANOM (AQ0040). ARPANOM (AQ0320) is coded in FORTRAN.

Anomaly screening of the AQDHS-II master file is accomplished by subjecting readings on the master file to various statistical screening tests. Only non-null readings which fall into one of the categories listed in Figure 6.4.3-a are screened. ACVANOM (AQ0040) selects readings to be screened, performs the gap test on hourly readings, produces a new AQDHS-II master file, and produces a file which is passed to ARPANOM (AQ0320). Refer to Section 5.5.5 for program operating instructions for ACVANOM (AQ0040).

ARPANOM (AQ0320) subjects all the data on the file passed from ACVANOM (AQ0040) to the appropriate anomaly screening tests. (Refer to Section 5.5.5.2.) Hourly readings are subjected to the pattern tests (maximum value test, adjacent hourly difference test, spike test, and modified Dixon ratio test) in addition to the gap test that is performed by ACVANOM (AQ0040). Daily readings are subjected to the Shewhart test.

The anomaly screening tests performed by ARPANOM (AQ0320) are discussed below.

Pattern Tests (Hourly Data) - There are four pattern tests: the maximum value test, the adjacent hourly difference test, the spike test, and the modified Dixon ratio test. The adjacent hourly difference test, the spike test, and the modified Dixon ratio test are applied only if one of the readings on which the test is based exceed 100 $\mu g/m^3$ for ozone and total oxidants, 20 mg/m^3 for carbon monoxide, 225 $\mu g/m^3$ for nitrogen dioxide and 650 $\mu g/m^3$ for sulfur dioxide.

Maximum value test - Readings that exceed an upper limit are judged anomalous. The upper limit is based on the pollutant, time of year, time of day, and geographic location. These upper limits are presented in Figure 6.4.3-b.

Adjacent hourly difference test - Any reading that differs from the reading for an adjacent hour by more than a specified limit is judged anomalous. The limit is based on the pollutant, time of year, time of day, and geographic location. These limits are presented in Figure 6.4.3-c.

Spike test - A spike is a reading that is higher than both the preceding and following readings or lower than both the preceding and following readings. If a spike occurs in the readings X_i, X_{i+1}, and X_{i+2}, then the following values are computed:

1. The absolute differences: $|X_{i+1} - X_i|$ and $|X_{i+1} - X_{i+2}|$
2. If the middle reading is high, the percentage by which the middle reading exceeds the outer readings.

$$\frac{X_{i+1} - X_i}{X_i} \times 100 \quad \text{and} \quad \frac{X_{i+1} - X_{i+2}}{X_{i+2}} \times 100$$

3. If the middle reading is low, the percentages by which the outer readings exceed the middle reading:

$$\frac{X_i - X_{i+1}}{X_{i+1}} \times 100 \quad \text{and} \quad \frac{X_{i+2} - X_{i+1}}{X_{i+1}} \times 100$$

The data is judged anomalous if both absolute differences exceed a maximum value or if both percentage differences exceed a maximum value. These values are presented in Figure 6.4.3-d.

Modified Dixon ratio test - This test is applied if there are valid readings for at least 18 hours and the coefficient of variation of the readings (i.e., standard deviation divided by mean) is greater than 0.75. The data is ordered lowest to highest. Letting x_1 represent the lowest value and x_n represent the highest value, the following ratio is computed:

$$r = \frac{x_n - x_{n-2}}{x_n - x_3}$$

The data is judged anomalous if this ratio exceeds 0.55. This test is not applied to readings for carbon monoxide.

Shewhart Test (Daily Data) - In order to apply the Shewhart test to a particular month of data, certain statistics relating to that month and three previous months of data are required: the range (the difference between the highest and the lowest values) and mean of the readings in the month being tested, the mean of the ranges of the three previous months, the mean of the means of the three previous months, and the number of non-null readings in the three previous months. These statistics are prepared by ACVANOM (AQ0040) using the three most previous months for which data is available. Upper control limits (UCL) and lower control limits (LCL) are computed for the range and mean as shown below.

For range, $UCL_R = D_4R$

$LCL_R = D_3\bar{R}$

for mean, $UCL_{\bar{X}} = \bar{\bar{X}} + A_2R$

$LCL_{\bar{X}} = \bar{\bar{X}} - A_2R$

where R = range of month being tested

$\bar{R}$ = mean of three previous monthly ranges

$\bar{X}$ = mean of month being tested

$\bar{\bar{X}}$ = mean of three previous monthly means

A_2, D_3, and D_4 vary depending upon the number of non-null readings in the three previous months (refer to Figure 6.4.3-e).

The data is judged anomalous if R exceeds UCL_R or $\bar{X}$ exceeds $UCL_{\bar{X}}$. Also, if the user so specifies, via the FLAG LOW option on the control card read by ACVANOM (AQ0040), the data will be judged anomalous if R is below LCL_R or $\bar{X}$ is below $LCL_{\bar{X}}$.

6.4.3.2 File Formats

The temporary file passed from ACVANOM (AQ0040) is the only input file to ARPANOM (AQ0320). See Section 5.5.5.2 for a discussion of this file.

There are four output files produced by ARPANOM (AQ0320): a diagnostic report, an anomaly screening report for hourly readings, an anomaly screening report for daily readings, and a file of skeleton transactions.

The diagnostic report consists of update messages, program statistics, and error messages. It also lists the option in effect. See Figure 6.4.3-f for a sample printout and Section 6.4.3.4 for a listing of the error messages.

The anomaly screening report for hourly readings identifies hourly readings that fail one or more anomaly screening tests and are thereby judged anomalous. The report also includes the key information required for columns 1 through 32 of the AQDHS-II master file transactions necessary to change the readings identified as anomalous. Since the gap test is based on an entire month of hourly readings, only key information is printed for gap test failures. For failures of the Dixon ratio test, the maximum value test, the adjacent hourly difference test, and the spike test, the key information is accompanied by the readings (in their original format) from the AQDHS-II master file record containing the anomalous data. The Dixon ratio test is based upon an entire day of hourly readings; the specific data causing failure of the test is not identified. The spike test is based upon three consecutive non-null readings; the readings causing failure of the test are flagged in the report with an S. The adjacent hourly difference test is based upon two consecutive non-null readings; the readings causing failure of the test are flagged in the report with an A. The maximum value test is based upon individual non-null readings; the reading causing failure of the test is flagged in the report with an M.

For gap test failures, entries for day (columns 19 and 20), start hour (columns 21 and 22), and decimal point indicator (column 32) are question marks in the report since the specific anomalous values cannot be identified. For failures of the other hourly anomaly screening tests, the entry for start hour is 'XX' and the entry for decimal point indicator is '*'. The appropriate start hour for the various readings is printed below the 'XX' entry. (For example, all readings printed in the first row for a given day have a start hour of '00'.) The decimal point indicator for each reading is printed with the reading.

See Figure 6.4.3-g for a sample printout of this type of anomaly screening report.

Data that fails any of the anomaly screening tests should be verified. Readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). Since the readings causing failure of the gap test are not printed in the report, it may be necessary to retrieve and list the raw data in question by executing ARTLNGP (AQ0110), ARTGENR (AQ0120), and ARPMSTR (AQ0230).

The anomaly screening report for daily readings identifies the daily readings that fail the Shewhart test and are thereby judged anomalous. There is no distinction between low and high Shewhart test failures in the report. The report includes the key information required for columns 1 through 32 of the AQDHS-II master file transactions necessary to change the readings identified as anomalous, as well as the readings (in their original format) from the AQDHS-II master file record containing the anomalous data. Since the Shewhart test is based upon an entire month of daily readings, the specific data causing a Shewhart test failure cannot be identified. The entry for day (columns 19 and 20) is '**' and the entry for decimal point indicator (column 32) is '*'. The decimal point indicator for each reading is printed with the reading.

See Figure 6.4.3-h for a sample printout of this type of anomaly screening report.

Data that fails the Shewhart test should be verified. Readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100).

The file of skeleton transactions produced by ARPANOM (AQ0320) contains skeleton transactions which may be used in creating AQDHS-II master file transactions to change any erroneous readings in the master file. One skeleton transaction will be included for each master file record determined to contain one or more anomalous readings. Only columns 1 through 32 and 80 of the skeleton transaction are filled in. Entries that cannot be determined by

ARPANOM (AQ0320) are represented by question marks. See Figure 6.4.3-i for the format of these skeleton transactions.

Before the skeleton transactions can be used to update the master file, the user must complete those skeleton transactions which he has determined are needed for updating his master file. Anomalous data that has been verified as correct should not be changed; consequently, the associated skeleton transaction should be discarded. The user may need to duplicate certain skeleton transactions; e.g., if more than one reading needs to be corrected in a given record, or if readings from more than one day need to be corrected in a month of hourly readings which failed the gap test. Question marks in a skeleton transaction indicate that the field which has question marks in it must be replaced by the appropriate information for that field (e.g., day, start hour, and/or decimal code). The correct reading should be entered in the appropriate position in columns 33 through 36 for daily readings or in columns 33 through 64 for hourly readings. See Section 4.5.1.1 for complete information on master file transactions. Note that the skeleton transactions for hourly readings are form-1 transactions and the skeleton transactions for daily readings are form-2 transactions.

6.4.3.3 Options

Options for ARPANOM (AQ0320) are specified via a control card read by ACVANOM (AQ0040). Refer to Section 5.5.5.3 for the format of this control card.

The 'low Shewhart' option is triggered by FLAG LOW on the control card read by ACVANOM (AQ0040). This option causes daily data to be compared to the lower control limits as well as the upper control limits by the Shewhart test (refer to Section 6.4.3.1). Use of this option is not recommended for general use (refer to Section 6.4.3.6).

The 'no low Shewhart' option is triggered by NO FLAG LOW on the control card read by ACVANOM (AQ0040) or by a blank or missing control card. This option causes daily data to be compared only to upper control limits by the Shewhart test (refer to Section 6.4.3.1).

Note: Once either option is executed, that data is flagged and will not be subjected to anomaly screening again unless the flags are reset.

6.4.3.4 Error Messages

ARPANOM 001 DISASTER - INVALID OR MISSING HEADER RECORDS ON INPUT FILE
Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has invalid or missing header records.
Action: Call NADB.

ARPANOM 002 ABORT - INVALID OPTION
Meaning: The option card read by ACVANOM (AQ0040) was invalid.
Action: Correct or delete the option card and re-execute ACVANOM (AQ0040) and ARPANOM (AQ0320).

ARPANOM 003 DISASTER - INPUT FILE CONTAINS DATA NOT TO BE SCREENED
Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) contains data which does not fall into one of the categories in Figure 6.4.3-a.
Action: Call NADB.

ARPANOM 004 ABORT - INVALID STATE CODE (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ).
Meaning: A master file record has an invalid state code. (Note: this error can only occur when screening readings for sulfur dioxide.) XXXXXXXXXXXXX is the state-area-site-agency-project-

time codes, YYYYYY is the year-month-day, and ZZZZZZZZZ is the parameter-method-unit codes of the record causing the error.

Action: Correct the master file using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). Re-execute ACVANOM (AQ0040) and ARPANOM (AQ0320).

ARPANOM 005 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 006 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 007 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 008 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

6.4.3.5 Cataloged JCL

ARPANOM (AQ0320) should always be executed in conjunction with ACVANOM (AQ0040). The JCL presented in this section is used to execute both programs.

6.4.3.5.1 JCL listing - Figure 6.4.3-j contains a listing of the cataloged procedure AQRPM45.

6.4.3.5.2 Cross-reference of DD names and files

Program Name: ACVANOM (AQ0040):

DD Name	File Description	Input/Output
AQSOLDMF	Input AQDHS-II master file	Input
AQSNEWMF	Output AQDHS-II master file	Output
AQSOPTIN	Option card file	Input
AQSPARM	AQDHS-II parameter file	Input
AQSANOMF	Temporary file passed to ARPANOM (AQ0320)	Output
AQSPRINT	Anomaly screening master file conversion program diagnostic report	Output

Program Name: ARPANOM (AQ0320):

Note: Since ARPANOM (AQ0320) is coded in FORTRAN, the DD names are machine-dependent. The DD names listed here are for IBM 360/370 computers. The FORTRAN device numbers are provided in parentheses after the listed DD names.

DD Name	File Description	Input/Output
FT06F001 (6)	Anomaly screening report program diagnostic report	Output
FT07F001 (7)	Anomaly screening report for hourly readings	Output
FT08F001 (8)	Anomaly screening report for daily readings	Output

DD Name	File Description	Input/Output
FT09F001 (9)	Temporary file received from ACVANOM (AQ0040)	Input
FT10F001 (10)	Skeleton transactions	Output

6.4.3.5.3 <u>User-supplied JCL</u> - To execute the cataloged procedure AQRPM45, the user can expect to supply job accounting information (job card), names of input and output AQDHS-II master files, the name of the AQDHS-II parameter file, and the name of the skeleton transaction file produced by ARPANOM (AQ0320). Other JCL elements likely to be supplied by the user are the time parameters. See Figure 6.4.3-k for a description of the procedure's substitutable parameters.

5.5.5.5.4 <u>Sample run streams</u> - The following run stream would screen the AQDHS-II master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.MF110278'. The new AQDHS-II master file is named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.MF110578'. The AQDHS-II parameter file is 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PF090378'. The skeleton transaction file produced by ARPANOM (AQ0320) is named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.ST110578'.

```
//   EXEC   AQRPM45,OLDMSTR='MF110278',
//          NEWMSTR='MF110578',
//          PARMFIL='PF090378',
//          SKEL='ST110578'
```

The following run stream accomplishes the same functions as the preceding run stream with these modifications: the FLAG LOW option is specified, the file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) is cataloged and named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TF110578', the skeleton transaction file produced by ARPANOM (AQ0320) is written to punched cards rather than disk, and the time specification for ACVANOM (AQ0040) is three minutes.

```
//   EXEC  AQRPM45,OLDMSTR='MF110278',
//         NEWMSTR='MF110578',
//         PARMFIL='PF090378',
//         TIME1=3,
//         DISP3='NEW,CATLG',
//         DISP4='OLD,KEEP'
//CONVERT.OPTION DD *
FLAG LOW
/*
//CONVERT.AQSANOMF DD   DSNAME=CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TF110578,
//            UNIT=3330,
//            VOL=(PRIVATE,SER=CDHSPK)
//REPORT.FT09F001  DD   DSNAME=CN.EPALMH.A087.CDHS.HQ.AQS.DATA.TF110578
//REPORT.FT10F001  DD   SYSOUT=B
```

6.4.3.6 Warnings and Special Instructions

To screen the AQDHS-II master file, both ACVANOM (AQ0040) and ARPANOM (AQ0320) must be executed successfully.

All readings subjected to anomaly screening tests are converted to standard units by using the appropriate standard units conversion factor from the AQDHS-II parameter file. Thus it is imperative that the standard units conversion factors on the parameter file are correct. Execution of ARPPARM (AQ0240) will permit verification of entries in the parameter file.

Records causing error 'ACVANOM 006' or 'ACVANOM 007' are not subjected to, nor included in, any anomaly screening tests.

Any readings identified in the reports from ARPANOM (AQ0320) as being anomalous should be verified. Any readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). The skeleton transactions created by ARPANOM (AQ0320) may be used to create the necessary master file transactions. The user is cautioned to save all printed anomaly screening reports until all anomalous data has been checked and verified or changed. If anomalous data has been verified, it is recommended that this verification be forwarded to the user's Regional Office when this data is submitted to SAROAD.

When ACVANOM (AQ0040) is executed, the reading and record status flags in the master file are appropriately changed to indicate which readings have been screened. Data that has been screened will not be subjected to anomaly screening again. However, if a screened reading is subsequently changed using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100) then both the reading status flag and the record status flag are reset and the changed reading is screened during the next execution of ACVANOM (AQ0060) and ARPANOM (AQ0320).

No reading in the AQDHS-II master file is changed or deleted by the anomaly screening programs. The user bears the sole responsibility of changing any values found to be in error.

The anomaly screening tests are applied only to non-null readings which fall into one of the categories in Figure 6.4.3-a. Other readings are not subjected to anomaly screening tests. Furthermore, the anomaly screening programs cannot be expected to identify all erroneous readings among those categories since a reading can be in error without being judged anomalous. Thus, one cannot assume that readings that pass the anomaly screening tests are valid. The anomaly screening programs are only tools to improve the quality of data in the AQDHS-II master file.

The FLAG LOW option is not recommended for ordinary use for two reasons. First, the major concern in air quality data is valid high readings which exceed the standards. The FLAG LOW option identifies readings that are classified anomalous even though they may be considerably below the standards. Secondly, the FLAG LOW option may identify a large quantity of readings as being anomalous.

There is no distinction between low and high Shewhart test failures in the anamoly screening report for daily data.

6.4.3.7 Cost Considerations

The following estimates are for the execution of ARPANOM (AQ0320) on an IBM 370/168:

Size of input file from ACVANOM (AQ0040)	978 records
CPU time	3.4 seconds
I/O time	5.6 seconds
Total time	9.0 seconds
Estimated cost	$7.11

6.4.3.8 Related Programs and Procedures

ARPANOM (AQ0320) should always be executed in conjunction with ACVANOM (AQ0320). The cataloged procedure AQRPM45 will execute both programs.

Pollutant	Sampling Interval	Parameter Code	AQDHS-II Time Code
Total Suspended Particulate	Daily	11101	8
Carbon Monoxide	Hourly	42101	1
Sulfur Dioxide	Hourly	42401	1
Sulfur Dioxide	Daily	42401	8
Nitrogen Dioxide	Hourly	42602	1
Nitrogen Dioxide	Daily	42602	8
Total Oxidants	Hourly	44101	1
Ozone	Hourly	44201	1

Figure 6.4.3-a. Categories of Data to be Subjected to Anomaly Screening Tests

Pollutant	Stratification	Maximum Value*
Ozone and Total Oxidants	May - October, 10 a.m. - 5 p.m.	1000 $\mu g/m^3$
	May - October, 6 p.m. - 9 a.m.	750 $\mu g/m^3$
	November - April, 10 a.m. - 5 p.m.	500 $\mu g/m^3$
	November - April, 6 p.m. - 9 a.m.	300 $\mu g/m^3$
Carbon Monoxide	6 a.m. - 10 a.m., 4 p.m. - 8 p.m.	75 mg/m^3
	11 a.m. - 3 p.m., 9 p.m. - 5 a.m.	50 mg/m3
Nitrogen Dioxide	---------	1200 $\mu g/m^3$
Sulfur Dioxide	EPA Regions 1, 5, 6, 7	2600 $\mu g/m^3$
	EPA Regions 2, 3, 4	1300 $\mu g/m^3$
	EPA Regions 8, 9, 10	800 $\mu g/m^3$

---

*Source: Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Environmental Protection Agency.

Figure 6.4.3-b. Test Values for the Maximum Value Test

Pollutant	Stratification	Maximum Difference*
Ozone and Total Oxidants	May - October, 10 a.m. - 5 p.m.	300 $\mu g/m^3$
	May - October, 6 p.m. - 9 a.m.	200 $\mu g/m^3$
	November - April, 10 a.m. - 5 p.m.	250 $\mu g/m^3$
	November - April, 6 p.m. - 9 a.m.	200 $\mu g/m^3$
Carbon Monoxide	-----------------	25 mg/m^3
Nitrogen Dioxide	-----------------	500 $\mu g/m^3$
Sulfur Dioxide	EPA Regions 1, 5, 6, 7	500 $\mu g/m^3$
	EPA Regions 2, 3, 4	300 $\mu g/m^3$
	EPA Regions 8, 9, 10	200 $\mu g/m^3$

---

*Source: Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Environmental Protection Agency.

Figure 6.4.3-c. Test Values for the Adjacent Hourly Difference Test

Pollutant	Stratification	Maximum Absolute* Difference	Maximum Percentage* Difference
Ozone and Total Oxidants	10 a.m. - 5 p.m.	200 $\mu g/m^3$	300%
	6 p.m. - 9 a.m.	100 $\mu g/m^3$	300%
Carbon Monoxide	--------	20 mg/m^3	500%
Nitrogen Dioxide	--------	200 $\mu g/m^3$	300%
Sulfur Dioxide	---------	200 $\mu g/m^3$	500%

---

*Source: Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Environmental Protection Agency.

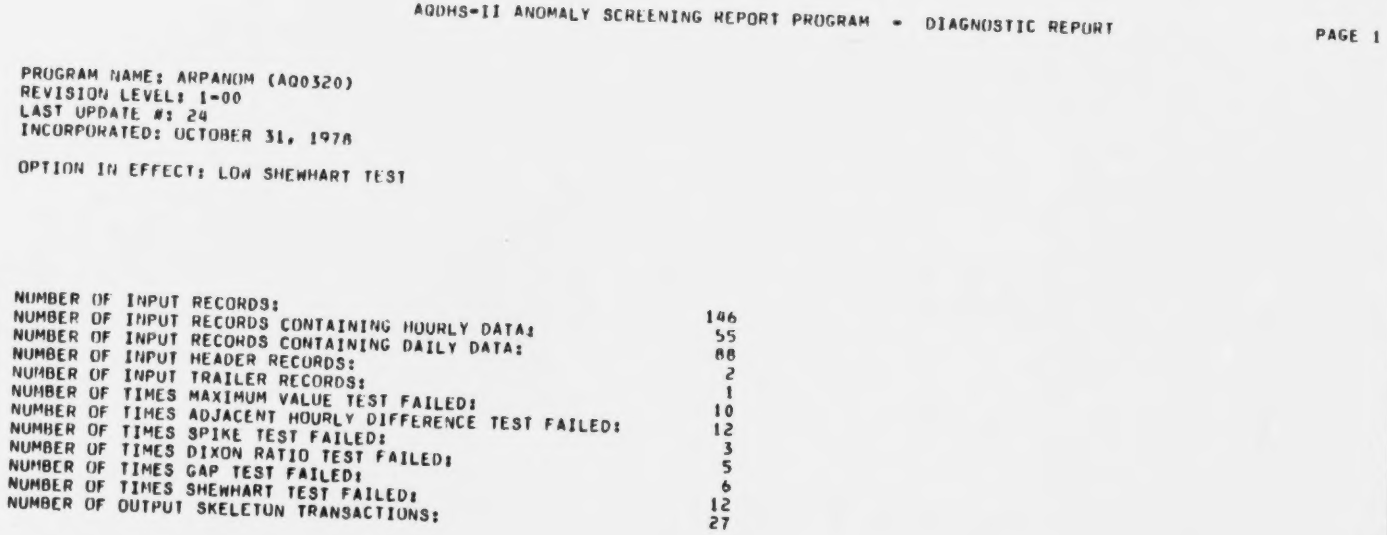
Figure 6.4.3-d. Test Values for the Spike Test

Number of Readings	Shewhart Test Coefficients*		
	A_2	D_3	D_4
2	1.88	0.00	3.27
3	1.02	0.00	2.57
4	0.73	0.00	2.28
5	0.58	0.00	2.11
6	0.48	0.00	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.26	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20 or more	0.18	0.41	1.59

---

*Source: Grant, Eugene L., Statistical Quality Control, 3rd edition (New York: McGraw-Hill Book Company), p. 562.

Figure 6.4.3-e. Shewhart Test Coefficients



```
                    AQDHS-II ANOMALY SCREENING REPORT PROGRAM  -  DIAGNOSTIC REPORT                  PAGE 1

PROGRAM NAME: ARPANOM (AQ0320)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
INCORPORATED: OCTOBER 31, 1978

OPTION IN EFFECT: LOW SHEWHART TEST



NUMBER OF INPUT RECORDS:                                        146
NUMBER OF INPUT RECORDS CONTAINING HOURLY DATA:                  55
NUMBER OF INPUT RECORDS CONTAINING DAILY DATA:                   88
NUMBER OF INPUT HEADER RECORDS:                                   2
NUMBER OF INPUT TRAILER RECORDS:                                  1
NUMBER OF TIMES MAXIMUM VALUE TEST FAILED:                       10
NUMBER OF TIMES ADJACENT HOURLY DIFFERENCE TEST FAILED:          12
NUMBER OF TIMES SPIKE TEST FAILED:                                3
NUMBER OF TIMES DIXON RATIO TEST FAILED:                          5
NUMBER OF TIMES GAP TEST FAILED:                                  6
NUMBER OF TIMES SHEWHART TEST FAILED:                            12
NUMBER OF OUTPUT SKELETON TRANSACTIONS:                          27
```

Figure 6.4.3-f. Diagnostic Report

```
                            AQDHS-II ANOMALY SCREENING REPORT FOR HOURLY READINGS                                         PAGE    1

------------- COLUMNS 1 THRU 32 -------------  ------------------------------------------------------------------------  ----  ----
0 00 0000 001 1 11 1 11 11 12 22 22222 22 33 3  READINGS(FORMAT IS N XXXX WHERE N=DECIMAL PT INDICATOR, XXXX=READING)   D R   GAP
1 23 4567 890 1 23 4 56 78 90 12 34567 89 01 2    CC33     CC37     CC41     CC45     CC49     CC53     CC57     CC61    TEST  TEST
----------------------------------------------  ------------------------------------------------------------------------  ----  ----

1-10-0001-001-E-02-1-71-06-??-??-42401-11-07-*                                                                                FAIL

1-12-0001-003-C-01-1-78-04-15-XX-42101-11-05-*
                                        00      1 0290   1 0170   1 0170   1 0170   1 0120   1 0120   1 0230   1 0290   N/A

                                        08      0 9999   1 0690   1 0230   1 0380   1 0170   1 0170   1 0120   1 0120
                                                           A        A
                                        16      1 0170   1 0170   1 0230   1 0230   1 0460   1 0920   1 0800   1 0290
                                                                                      A        AM       AM       A

1-12-0001-003-C-01-1-78-04-??-??-42101-11-05-*                                                                                FAIL

1-12-0001-003-C-01-1-78-01-31-XX-42101-11-06-*
                                        00      0 9999   0 9999   0 9999   0 9999   0 9999   0 9999   0 9999   0 9999   N/A

                                        08      0 9999   0 9999   1 0034   1 0031   1 0022   1 0024   1 0026   1 0029

                                        16      1 0040   1 0003   1 0002   1 5747   1 8045   1 5747
                                                                    A        AMS      AMS      AMS

1-12-0001-003-C-01-1-78-11-22-XX-42602-14-07-*
                                        00      3 0360   3 0345   3 0340   3 0335   3 0350   3 0375   3 0385   3 0760   N/A
                                                                                                        A        AM
                                        08      3 0900   3 0840   3 0400   3 0320   3 0340   3 0330   3 0340   3 0390
                                                  M        AM       A
                                        16      3 0380   3 0440   3 0385   3 0350   3 0335   3 0330   3 0340   3 0340

1-12-0001-003-C-01-1-78-11-??-??-42602-14-07-*                                                                                FAIL

1-12-0001-003-C-01-1-78-12-30-XX-42602-14-07-*
                                        00      3 0155   3 0150   3 0150   3 0155   3 0150   3 0150   3 0150   3 0145   FAIL

                                        08      3 0155   3 0170   3 0150   3 0160   3 0240   3 0290   3 0290   3 0335
                                                                                                                 AS
                                        16      3 4550   3 0600   3 0405   3 0290   3 0270   3 0250   3 0250   3 0260
                                                  AMS      AS

1-12-0001-003-C-01-1-78-12-??-??-42602-14-07-*                                                                                FAIL

*  DECIMAL PT INDICATORS ARE LISTED WITH READINGS
** TEST CODES (PRINTED BELOW READINGS): A=ADJACENT HOURLY DIFFERENCE TEST, M=MAXIMUM VALUE TEST, S=SPIKE TEST
```

Figure 6.4.3-g. Anomaly Screening Report for Hourly Readings

```
                              AQDHS-II ANOMALY SCREENING REPORT FOR DAILY READINGS                                                PAGE    1

------------- COLUMNS 1 THRU 32 --------------  -----  ------------------------------------------------------------------------  ------
0 00 0000 001 1 11 1 11 11 12 22 22222 22 33 3                                                                                    SHEWHT
1 23 4567 890 1 23 4 56 78 90 12 34567 89 01 2  DAYS   READINGS(FORMAT IS N XXXX WHERE N=DECIMAL PT INDICATOR, XXXX=READING)  TEST
----------------------------------------------  -----  ------------------------------------------------------------------------  ------

2-34-0001-004-A-06-8-77-01-**-00-11101-91-01-*   1- 8  0 0035   0 9999   0 9999   0 9999   0 9999   0 9999   0 0964   0 9999   FAIL
                                                 9-16  0 9999   0 9999   0 9999   0 9999   0 0025   0 9999   0 9999   0 9999
                                                17-20  0 9999   0 9999   0 9999   0 0000

2-34-0001-004-A-06-8-77-02-**-00-11101-91-01-*   1- 8  0 0455   0 0455   0 0455   0 0455   0 0455   0 0455   0 0455   0 0455   FAIL
                                                 9-16  0 0455   0 0455   0 0455   0 0065   0 0455   0 0455   0 0455   0 0455
                                                17-24  0 0455   0 0119   0 0455   0 0455   0 0455   0 0455   0 0455   0 0455

2-34-0001-003-A-06-8-76-12-**-00-42401-91-01-*   1- 8  0 1500   0 9999   0 9999   0 9999   0 9999   0 9999   0 9999   0 9999   FAIL
                                                 9-16  0 9999   0 9999   0 9999   0 9999   0 9999   1 0000   0 9999   0 9999
                                                17-24  0 9999   0 9999   0 9999   1 0014   0 9999   0 9999   0 9999   0 9999
                                                25-26  0 9999   1 0000

2-34-0001-003-A-06-8-77-01-**-00-42401-91-01-*   1- 8  1 0000   0 1500   0 9999   0 9999   0 9999   0 9999   1 0000   0 9999   FAIL
                                                 9-16  0 9999   0 9999   0 9999   0 9999   1 0012   0 9999   0 9999   0 9999
                                                17-24  0 9999   0 9999   1 0034   0 9999   0 9999   0 9999   0 9999   0 9999
                                                25-31  1 0000   0 9999   0 9999   0 9999   0 9999   0 9999   1 0000

2-34-0001-003-A-06-8-77-03-**-00-42401-91-01-*   1- 8  0 9999   1 0113   0 9999   0 9999   0 9999   0 9999   0 9999   1 0074   FAIL
                                                 9-16  0 9999   0 9999   0 9999   0 9999   0 9999   1 0076   0 9999   0 9999
                                                17-24  0 9999   0 9999   0 9999   1 0143   0 9999   0 9999   0 9999   0 9999
                                                25-26  0 9999   0 9450

*  DECIMAL PT INDICATORS ARE LISTED WITH READINGS
** DAY VARIES, VALID ENTRIES ARE 1 THRU 31
```

The 'DAYS' column indicates the days for the readings printed on each line. For example, 1.4 is the reading for January 20, 1977.

Decimal points are printed with the readings.

Figure 6.4.3-h. Anomaly Screening Report for Daily Readings

Record Position	Field Length	Description
1	1	Form Code
2 - 3	2	State Code
4 - 7	4	Area Code
8 - 10	3	Site Code
11	1	Agency Code
12 - 13	2	Project Code
14	1	Time Code
15 - 16	2	Year
17 - 18	2	Month
19 - 20	2	Day (?? if unknown)
21 - 22	2	Start Hour (?? if unknown)
23 - 27	5	Parameter Code
28 - 29	2	Method Code
30 - 31	2	Units Code
32	1	Decimal Code (? if unknown)
33 - 79	47	Unused
80	1	Action Code (should be 3 to indicate change)

Figure 6.4.3-i. Record Format for Skeleton Transactions from ARPANOM (AQ0320)

```
//*
//*    PROCEDURE NAME: AQRPM45
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO SCREEN THE AQCHS-II MASTER FILE
//*    FOR ANOMALOUS DATA AND TO PRODUCE A NEW AQDHS-II MASTER FILE WITH
//*    THE STATUS FLAGS SET APPROPRIATELY
//*
//*
//AQRPM45 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//              PROG1=ACVANOM,
//              PROG2=ARPANOM,
//              TIME1='2,0',
//              TIME2='1,0',
//              OLDMSTR=AQOLDMST,
//              NEWMSTR=AQNEWMST,
//              PARMFIL=AQPARMFL,
//              SKEL='ANOM.SKEL',
//              DISP1='OLD,KEEP,KEEP',
//              DISP2='NEW,CATLG',
//              DISP3='NEW,PASS',
//              DISP4='OLD,DELETE',
//              UNIT1=DISK,
//              UNIT2=DISK,
//              SER1=CDHSPK,
//              SER2=CDHSPK,
//              PRI1=50,
//              SEC1=20,
//              PRI2=10,
//              SEC2=5,
//              PRI3=4,
//              SEC3=2,
//              SPUNIT1=TRK,
//              SPUNIT2=TRK
//*
//* REFLAG MASTER FILE AND PRODUCE FORTRAN-COMPATIBLE FILE
//*
//CONVERT EXEC PGM=&PROG1,
//              TIME=(&TIME1)
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//              DISP=SHR
//*
//* INPUT DATA SET - OLD MASTER FILE
//*
//AQSOLDMF  DD DSNAME=&PROJECT..DATA.&OLDMSTR,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(&DISP1)
//*
//* OUTPUT DATA SET - NEW MASTER FILE
//*
//AQSNEWMF  DD DSNAME=&PROJECT..DATA.&NEWMSTR,
```

(page 1 of 3)

Figure 6.4.3-j. Cataloged Procedure AQRPM45

```
//             VOLUME=(PRIVATE,SER=&SER1),
//             DISP=(&DISP2),
//             UNIT=&UNIT1,
//             SPACE=(&SPUNIT1,(&PRI1,&SEC1),RLSE)
//*
//* INPUT DATA SET - OPTION CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - FORTRAN-COMPATIBLE FILE
//*
//AQSANOMF  DD DSNAME=&&ANOM,
//             DISP=(&DISP3),
//             UNIT=SYSDA,
//             SPACE=(&SPUNIT1,(&PRI2,&SEC2),RLSE)
//*
//* INPUT DATA SET - PARAMETER FILE
//*
//AQSPARM   DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=PRIVATE,
//             DISP=(&DISP1)
//*
//* OUTPUT DATA SET - DIAGNOSTICS
//*
//AQSPRINT  DD SYSOUT=A
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=A
//*
//SYSOUT    DD SYSOUT=A
//*
//SYSDBOUT  DD SYSOUT=A
//*
//SYSDTERM  DD SYSOUT=A
//*
//SYSUDUMP  DD SYSOUT=A
//*
//* PRODUCE ANOMALY SCREENING REPORT
//*
//REPORT  EXEC PGM=&PROG2,
//             COND=(0,NE),
//             TIME=(&TIME2)
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             VOLUME=PRIVATE,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - FROM PREVIOUS STEP
//*
//FT09F001  DD DSNAME=&&ANOM,
//             VOLUME=PRIVATE,
//             DISP=(&DISP4)
//*
//* OUTPUT DATA SET - DIAGNOSTICS
//*
//FT06F001  DD SYSOUT=A,
```

(page 2 of 3)

Figure 6.4.3-j - continued. Cataloged Procedure AQRPM45

```
//             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=133)                   00011700
//*                                                                    00011800
//* OUTPUT DATA SET - ANOMALY REPORT FOR HOURLY READINGS               00011900
//*                                                                    00012000
//FT07F001  DD SYSOUT=A,                                               00012100
//             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=133)                   00012200
//*                                                                    00012300
//* OUTPUT DATA SET - ANOMALY REPORT FOR DAILY READINGS                00012400
//*                                                                    00012500
//FT08F001  DD SYSOUT=A,                                               00012600
//             DCB=(RECFM=FBA,LRECL=133,BLKSIZE=133)                   00012700
//*                                                                    00012800
//* OUTPUT DATA SET - SKELETON TRANSACTIONS                            00012900
//*                                                                    00013000
//FT10F001  DD DSNAME=&PROJECT..DATA.&SKEL,                            00013100
//             VOLUME=(PRIVATE,SER=&SER2),                             00013200
//             DISP=(&DISP2),                                          00013300
//             UNIT=&UNIT2,                                            00013400
//             SPACE=(&SPUNIT2,(&PRI3,&SEC3),RLSE)                     00013500
//*                                                                    00013600
//* OUTPUT DATA SETS - SYSTEM OPERATION                                00013700
//*                                                                    00013800
//FT03F001  DD SYSOUT=A                                                00013900
//*                                                                    00014000
//SYSPRINT  DD SYSOUT=A                                                00014100
//*                                                                    00014200
//SYSUDUMP  DD SYSOUT=A                                                00014300
//*                                                                    00014400
```

(page 3 of 3)

Figure 6.4.3-j - continued. Cataloged Procedure AQRPM45

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names
PROG1	ACVANOM	Anomaly screening master file conversion program
PROG2	ARPANOM	Anomaly screening report program
TIME1	'2,0'	Time allocated for execution of ACVANOM
TIME2	'1,0'	Time allocated for execution of ARPANOM
OLDMSTR	AQOLDMST	Lowest-level index of input master file
NEWMSTR	AQNEWMST	Lowest-level index of output master file
PARMFIL	AQPARMFL	Lowest-level index of parameter file
SKEL	'ANOM.SKEL'	Lowest-level index of skeleton transactions
DISP1	'OLD,KEEP,KEEP'	Disposition of input master file
DISP2	'NEW,CATLG'	Disposition of output master file
DISP3	'NEW,PASS'	Disposition of temporary file output from ACVANOM
DISP4	'OLD,DELETE'	Disposition of temporary file input to ARPANOM
UNIT1	3330	Unit type to which output master file is to be written
UNIT2	3330	Unit type to which skeleton transactions are to be written
SER1	CDHSPK	Volume ID to which output master file is to be written
SER2	CDHSPK	Volume ID to which skeleton transactions are to be written
PRI1	50	Primary space allocation for output master file

(Page 1 of 2)

Figure 6.4.3-k. Substitutable Parameters for AQRPM45

Parameter Name	Default Value	Description
SEC1	20	Secondary space allocation for output master file
PRI2	10	Primary space allocation for temporary file
SEC2	5	Secondary space allocation for temporary file
PRI3	4	Primary space allocation for skeleton transactions
SEC3	2	Secondary space allocation for skeleton transactions
SPUNIT1	TRK	Units in which space for output master file and temporary file is to be allocated
SPUNIT2	TRK	Units in which space for skeleton transactions is to be allocated

(Page 2 of 2)

Figure 6.4.3-k - continued. Substitutable Parameters for AQRPM45

6.4.4 INVENTORY BY SITE REPORT PROGRAM - ARPINVS (AQ0280)

6.4.4.1 Description

ARPINVS (AQ0280) is a report program designed to describe the contents of the AQDHS-II master file in primary order by site-related fields and in secondary order by pollutant-related fields. The report generated by this program produces a one-line summary for each group of records which have the same site-related fields, pollutant-related fields, year, and time codes.

6.4.4.2 File Formats

Input to ARPINVS (AQ0280) consists of an AQDHS-II master file and its associated site and parameter files. See Figure 4.5.3-a for the master file format and Figure 4.2.2-c for the parameter file format. The input master file must be sorted into the sequence shown in Figure 5.6.2-e prior to its use by this program. This sorting can be accomplished by executing the master file sort program ASRMSTR (AQ0140) using the SITE option (see Section 5.6.2, Master File Sort Program).

Output consists of the printed report and a diagnostic messages report. The following statistics are given for each site-pollutant-year group: (1) the number of actual (non-null) readings among all the records in the group, (2) the minimum and maximum readings observed in the group, and (3) the average value of all non-null readings in the group. A sample of this output is shown in Figure 6.4.4-a.

6.4.4.3 Options

There are no options.

6.4.4.4 Error Messages

ARPINVS 001 ABORT - SITE FILE OVERFLOW: NUMBER OF SITE FILE RECORDS EXCEEDS PROGRAM STORAGE SPACE

Meaning: There are more records in the site file than the table (defined in the program) can accommodate; therefore, the run was terminated.

Action: Increase the size of the table in the program accordingly. Refer to Appendix C for instructions on changing the size of the table.

ARPINVS 002 ABORT - PARAMETER FILE OVERFLOW: NUMBER OF PARAMETER FILE RECORDS EXCEEDS PROGRAM STORAGE SPACE

Meaning: There are more records in the parameter file than the table (defined in the program) can accommodate; therefore, the run was terminated.

Action: Increase the size of the table in the program accordingly. Refer to Appendix C for instructions on changing the size of the table.

ARPINVS 003 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARM-TABLE SIZE

Meaning: The 77-level data item "NBR-OF-PARMS" does not coincide with the size of the parameter table defined in the program; therefore, the run was terminated.

Action: Refer to Appendix C for instructions on changing the 77-level data item.

ARPINVS 004 ABORT - LEVEL 77 DATA FIELD "NBR-OF-SITES" INCREASED BEYOND SITE-TABLE SIZE

Meaning: The 77-level data item "NBR-OF-SITES" does not coincide with the size of the site code table defined in the program; therefore, the run was terminated.

Action: Refer to Appendix C for instructions on changing the 77-level data item.

6.4.4.5 Cataloged JCL

6.4.4.5.1 JCL listing - ARPINVS (AQ0280) can be run by executing the cataloged procedure AQRPM35. This procedure also executes the master file sort program ASRMSTR (AQ0140). See Figure 6.4.4-b for a listing of this procedure.

6.4.4.5.2 Cross-reference of DD names and files

Program Name: ASRMSTR (AQ0140)

DD Name	File Description	Input/Output
AQSINPUT	AQDHS-II master file	Input
AQSOPTIN	Option card	Input
SORTWK01	Sort work file	Input/output
AQSOUTPT	Sorted AQDHS-II master file	Output
AQSPRINT	Diagnostic report	Output

Program Name: ARPINVS (AQ0280)

DD Name	File Description	Input/Output
AQSMASTR	Sorted AQDHS-II master file	Input
AQSPARM	AQDHS-II parameter file	Input
AQSSITES	AQDHS-II site file	Input
AQSPRINT	Inventory by site report and diagnostic messages	Output

6.4.4.5.3 User-supplied JCL - The SITE option of the master file sort program ASRMSTR (AQ0140) must be specified so that the master file will be sorted in the correct order for the site inventory. See Section 5.6.2.3 for additional information on this option card. In addition, the user must specify the data set names of the input master, parameter, and site files. See Figure 6.4.4-c for a description of the procedure's substitutable parameters.

6.4.4.5.4 Sample run stream - The following run stream from the baseline test run series produces a site inventory of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER':

```
//  EXEC AQRPM35,
//       MSTRFIL=AQMASTER,
//SORT.OPTION DD *
SITE
/*
```

6.4.4.6 Warnings and Special Instructions

To insure that a useable site inventory report is produced, the user should be careful to input the appropriate files. If the AQDHS-II master file is not sorted prior to running the program, the report will be fragmented with multiple entries for each site. If the user refers to auxiliary parameter or site files that do not contain all the parameters or sites on the master file, the resulting site report will contain valid data but some of the parameter or site description fields will be blank.

6.4.4.7 Cost Considerations

The following estimates are for the execution of ARPINVS (AQ0280) on an IBM 370/168:

Sorted AQDHS-II master file:	291 records
CPU time:	0.7 second
I/O time:	3.3 seconds
Total time:	4.0 seconds
Estimated cost:	$0.88

6.4.4.8 Related Programs and Procedures

This program must be run in conjunction with ASRMSTR (AQ0140) in order to insure a properly summarized report. The cataloged procedure AQRPM35 executes both programs.

```
                            AQDHS-II INVENTORY BY SITE REPORT PROGRAM  -  DIAGNOSTIC REPORT             PAGE     1
PROGRAM NAME: ARPINVS (AQ0280)
REVISION LEVEL:  1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

Figure 6.4.4-a. Inventory by Site Report (page 1 of 3)

```
                                AIR QUALITY DATA REPORT  -  INVENTORY BY SITE                              PAGE    11
STATE:    37     AQCR:   186     COUNTY:   3020
---------------------------------------------------------------------------------------------------------------------
 AREA    AGENCY            LOCATION                         POLLUTANT               POL-MTH  UN TM  YEAR   NUM    MIN       MAX       ARITH
 SITE     PROJ               NAME                             NAME                    CODE   CD CD          OBS    OBS       OBS        MEAN
---------------------------------------------------------------------------------------------------------------------

2260995  A05 SKIATOOK LAKE, TULSA, TULSA CO  SOLAR RADIATION                       6330111  18  1  1977  1379    0.0000    1.4400    0.2823
3000997  A05 SKIATOOK LAKE, TULSA, TULSA CO  NONMETHANE HYDROCARBONS               4310211  07  C  1975     1    0.0400    0.0400    0.0400
                                                                                                1  1974   168    0.0000    6.0000    1.6687
                                                                                                2  1977     1    0.9800    0.9800    0.9800
                                             LAPSE RATE                            6120221  28  1  1977    12   -1.0100    1.1700    0.2541
                                                                                                8  1963     2    0.9555  922.2000  461.5777
                                             TEMPERATURE                           6210120  15  2  1963    60    0.9000 9902.0000 2116.7010
                                                                                                8  1963     2   93.3300 9666.0000 4879.6650
                                             DEW POINT                             6210320  15  8  1963     2    9.4440 9111.0000 4560.2220
3000998  A05 SKIATOOK LAKE, TULSA, TULSA CO  LAPSE RATE                            6120221  28  8  1963     4  111.1000  112.4000  112.0250
                                                                                                8  1965    18    0.0020   57.0000    6.1731
                                                                                                9  1965     5    0.0023   23.0000    5.0655
3020996  A05 SKIATOOK LAKE, TULSA, TULSA CO  LAPSE RATE                            6120221  28  8  1963     4   51.0000   51.1000   51.0250
                                                                                                8  1965    18    0.0027  500.0000   41.7980
                                                                                                9  1965     5    0.0500  500.0000  110.1200
3140992  A05 SKIATOOK LAKE, TULSA, TULSA CO  LAPSE RATE                            6120221  28  8  1963     4   -2.0000    0.0000   -1.0000
                                                                                                8  1965    18  -56.0000   -0.0008   -4.6922
                                                                                                9  1965     5  -56.0000   -0.0056  -12.3334
3140994  A05 SKIATOOK LAKE, TULSA, TULSA CO  LAPSE RATE                            6120221  28  8  1963     4   -1.8000   -1.7000   -1.7750
                                                                                                8  1965    18  -50.0000   -0.0009   -6.4815
                                                                                                9  1965     5   -9.0000   -0.0009   -1.9821
                                             SOLAR RADIATION                       6330111  18  1  1977  1240    0.0000    1.3300    0.2762
```

(page 2 of 3)

Figure 6.4.4-a - continued. Inventory by Site Report

```
                                           ARPINVS (AQ0290) SUMMARY MESSAGES                                          PAGE     1
NUMBER OF INPUT RECORDS:          331
NUMBER OF ABORT MESSAGES:           0

PROGRAM NAME: ARPINVS (AQ0280)
REVISION LEVEL:  1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

Figure 6.4.4-a - continued. Inventory by Site Report (page 3 of 3)

```
//*
//*    PROCEDURE NAME: AQRPM35
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO PRODUCE A SITE INVENTORY OF THE
//*    AQDHS-II MASTER FILE
//*
//*
//AQRPM35 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROG1=ASRMSTR,
//             PROG2=ARPINVS,
//             TIME1='1,0',
//             TIME2='1,0',
//             MSTRFIL=AQMASTER,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             SPCUNIT=TRK,
//             PRIMARY=50,
//             SECNDRY=20,
//             TEMP=SYSDA,
//             SORTSPC=50,
//             OUT=A
//*
//SORT    EXEC PGM=&PROG1,
//             TIME=(&TIME1)
//*
//* SORT MASTER FILE INTO SITE INVENTORY SEQUENCE
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SORTLIB   DD DSN=SYS1.SORTLIB,
//             DISP=(SHR,PASS)
//*
//SORTWK01  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//SORTWK02  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//SORTWK03  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//* INPUT DATA SET - UNSORTED MASTER FILE
//*
//AQSINPUT  DD DSN=&PROJECT..DATA.&MSTRFIL,
//             DISP=(OLD,KEEP)
//*
//* INPUT DATA SET - OPTION CARD
//*
//AQSOPTIN  DD DDNAME=OPTION,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - SORTED MASTER FILE
//*
//AQSOUTPT  DD UNIT=&TEMP,
```

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Figure 6.4.4-b. Cataloged Procedure AQRPM35

```
//             DISP=(NEW,PASS,DELETE),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSN=&&MSTRSORT,
//             DCB=(RECFM=VB,LRECL=194,BLKSIZE=1556)
//*
//* OUTPUT DATA SET - DIAGNOSTIC REPORT
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
//*
//REPORT   EXEC PGM=&PROG2,
//             TIME=(&TIME2)
//*
//*  SITE INVENTORY REPORT PROGRAM
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - AQDHS-II MASTER FILE (SORTED)
//*
//AQSMASTR  DD DSNAME=&&MSTRSORT,
//             DISP=(OLD,PASS)
//*
//*  INPUT DATA SET - PARAMETER FILE
//*
//AQSPARM   DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - SITE FILE
//*
//AQSSITES  DD DSNAME=&PROJECT..DATA.&SITEFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - SITE INVENTORY REPORT
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//*  OUTPUT DATA SET - SYSTEM OPERATIONS
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
```

(page 2 of 3)

Figure 6.4.4-b - continued. Cataloged Procedure AQRPM35

```
//SYSDBOUT   DD SYSOUT=&OUT                                                             00011700
//*                                                                                     00011800
//SYSUDUMP   DD SYSOUT=&OUT                                                             00011900
//*                                                                                     00012000
//SYSDTERM   DD SYSOUT=&OUT                                                             00012100
//*                                                                                     00012200
```

(page 3 of 3)

Figure 6.4.4-b - continued. Cataloged Procedure AQRPM35

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQMASTER would be the full data set name of an AQDHS-II master file)
PROG1	ASRMSTR	Master file sort program
PROG2	ARPINVS	Inventory by site report program
TIME1	'1,0'	Time allocated for execution of ASRMSTR
TIME2	'1,0'	Time allocated for execution of ARPINVS
MSTRFIL	AQMASTER	Lowest-level index of input master file
PARMFIL	AQPARMFL	Lowest-level index of input parameter file
SITEFIL	AQSITEFL	Lowest-level index of input site file
SPCUNIT	TRK	Units in which space for sorted master file and temporary sort file is to be allocated
PRIMARY	50	Primary space allocation for sorted master file
SECNDRY	20	Secondary space allocation for sorted master file
TEMP	SYSDA	Device type for temporary sort file
SORTSPC	50	Space allocation for temporary file
OUT	A	SYSOUT class for all print files

Figure 6.4.4-c. Substitutable Parameters for AQRPM35

6.4.5 INVENTORY BY POLLUTANT REPORT PROGRAM - ARPINVP (AQ0290)

6.4.5.1 Description

ARPINVP (AQ0290) is a report program designed to describe the contents of the AQDHS-II master file in primary order by pollutant-related fields and in secondary order by site-related fields. The report generated by this program produces a one-line summary for each group of records which have the same pollutant-related fields, site-related fields, year, and time codes.

6.4.5.2 File Formats

Input to this program consists of an AQDHS-II master file and its associated parameter and site files. The input master file must be sorted into the sequence shown in Figure 5.6.2-d prior to its use by this program. This sorting can be accomplished by executing the master file sort program ASRMSTR (AQ0140) using the PARM option (see Section 5.6.2, Master File Sort Program). This sorting is necessary because the report is arranged primarily by pollutant-related fields, while the master file is ordered primarily by site-related fields.

Output consists solely of the printed report. The following statistics are given for each pollutant-site-year group: (1) the number of actual (non-null) readings among all the records in the group, (2) the minimum and maximum observations in the group, and (3) the average value of the readings. A sample of this output is shown in Figure 6.4.5-a. Summary statistics for the report include an input record count and an output line count.

6.4.5.3 Options

There are no options.

6.4.5.4 Error Messages

ARPINVP 001 ABORT - POLLUTANT TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II parameter file exceeds the limit of 200 imposed by the parameter code table in the program; therefore, the run was terminated.

Action: Either decrease the size of the input parameter file or increase the size of the parameter code table in the program (see Appendix C: Program Modification).

ARPINVP 002 ABORT - SITE TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II site file exceeds the limit of 200 imposed by the site code table in the program; therefore, the run was terminated.

Action: Either decrease the size of the input site file or increase the size of the site code table in the program (see Appendix C: Program Modification).

ARPINVP 003 ABORT - LEVEL 77 DATA FIELD "PARM-MAX" INCREASED BEYOND PARM-TABLE SIZE

Meaning: In an attempt to increase the size of the parameter table in the program, the user has changed only one of the two pertinent lines of code; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the parameter table.

ARPINVP 004 ABORT - LEVEL 77 DATA FIELD "SITE-MAX" INCREASED BEYOND SITE-TABLE SIZE

Meaning: In an attempt to increase the size of the site table in the program, the user has changed only one of the two pertinent lines of code; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the site table.

6.4.5.5 Cataloged JCL

6.4.5.5.1 JCL listing - ARPINVP (AQ0290) may be run by executing the cataloged procedure AQRPM40. This procedure also executes the master file sort program ASRMSTR (AQ0140). See Figure 6.4.5-b for a listing of this procedure.

6.4.5.5.2 Cross-reference of DD names and files

Program Name: ASRMSTR (AQ0140)

DD Name	File Description	Input/Output
AQSINPUT	AQDHS-II master file	Input
AQSOPTIN	Option card	Input
AQSOUTPT	Sorted master file	Output
AQSPRINT	Diagnostic report	Output

Program Name: ARPINVP (AQ0290)

DD Name	File Description	Input/Output
AQSMASTR	Sorted master file	Input
AQSPRMFL	Parameter file	Input
AQSSITFL	Site file	Input
AQSPRTFL	Pollutant inventory	Output

6.4.5.5.3 User-supplied JCL - The option card in the sort step must be present for the file to be sorted in the correct order for the pollutant inventory. The value to be placed in columns 6 through 9 of the option card is 'PARM'. In addition, the user must specify the data set names of the input master, parameter, and site files. See Figure 6.4.5-c for a description of the procedure's substitutable parameters.

6.4.5.5.4 Sample run stream - The following run stream would produce a pollutant inventory of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.AQFINAL':

```
// EXEC AQRPM40,
//      MSTRFIL=AQFINAL,
//      PARMFIL=HTPARMAA,
//      SITEFIL=HTSITEAA
//SORT.OPTION DD *
PARM
/*
```

6.4.5.6 Warnings and Special Instructions

To insure that a useable pollutant inventory is produced, the user should be careful to input the appropriate files. If the AQDHS-II master file is not sorted prior to running the program, the report will be fragmented with multiple entries for each pollutant. If the user refers in his JCL to an auxiliary file that does not contain all the parameters or sites on his master file, he will still obtain a pollutant report with valid data but will find that some of his parameter or site description fields are blank.

6.4.5.7 Cost Considerations

The following estimates are for the execution of ARPINVP (AQ0290) on an IBM 370/168:

Size of AQDHS-II master file:	291 records
Size of parameter file:	99 records
Size of site file:	24 records
CPU time:	1.9 seconds
I/O time:	3.4 seconds
Total time:	5.4 seconds
Estimated cost:	$1.16

```
                                   AIR QUALITY DATA REPORT  -  INVENTORY BY POLLUTANT
PROGRAM NAME: ARPINVP (AQ0290)                                                                                  PAGE    1
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

-------------------------------------------------------------------------------------------------------------------------
POL-MTH          POLLUTANT            STATE-AQCR-CNTY- AG-
CODE               NAME               AREA-SITE CODES  PRJ          LOCATION            YEAR TIME UNIT  NUM   MIN    MAX   ARITH
----------------------------------------------------------------------  NAME                 CODE CODE  OBS   OBS    OBS    MEAN
-------------------------------------------------------------------------------------------------------------------------
1110191  TOTAL SUSPENDED PARTICULATE  3416909600001001 A06  YADKIN RD., FAYETTEVILLE, CU 1965  1    01     8 1.000  9021.  2130.5
                                                                                        1979  1    01    16 1.000  9021.  1068.0
4240131         SULFUR DIOXIDE        3416909600001001 A06  YADKIN RD., FAYETTEVILLE, CU 1965  1    01     3 37.00  9928.  3334.0
                                                                                        1979  1    01     3 37.00  9928.  3334.0
```

Figure 6.4.5-a. Inventory by Pollutant Report (page 1 of 2)

```
                              ARPINVP (AQ0290) SUMMARY MESSAGES                              PAGE   1
INPUT RECORD COUNT:          4
OUTPUT LINE COUNT:           4

PROGRAM NAME: ARPINVP (AQ0290)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978
```

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Figure 6.4.5-b - continued. Inventory by Pollutant Report

```
//*
//*   PROCEDURE NAME: AQRPM40
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO PRODUCE A POLLUTANT (PARAMETER)
//*   INVENTORY OF THE AQDHS-II MASTER FILE
//*
//*
//AQRPM40 PROC PROJECT='CN.EPALMH.A087,CDHS,HQ.AQS',
//             PROG1=ASRMSTR,
//             PROG2=ARPINVP,
//             TIME1='1,0',
//             TIME2='1,0',
//             MSTRFIL=AQMASTER,
//             PARMFIL=AQPARMFL,
//             SITEFIL=AQSITEFL,
//             SPCUNIT=TRK,
//             PRIMARY=50,
//             SECNDRY=20,
//             TEMP=SYSDA,
//             SORTSPC=50,
//             OUT=A
//*
//SORT    EXEC PGM=&PROG1,
//             TIME=(&TIME1)
//*
//* SORT MASTER FILE INTO POLLUTANT INVENTORY SEQUENCE
//*
//STEPLIB   DD DSN=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SORTLIB   DD DSN=SYS1.SORTLIB,
//             DISP=(SHR,PASS)
//*
//SORTWK01  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//SORTWK02  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//SORTWK03  DD UNIT=&TEMP,
//             SPACE=(&SPCUNIT,&SORTSPC,,CONTIG)
//*
//* INPUT DATA SET - UNSORTED MASTER FILE
//*
//AQSINPUT  DD DSN=&PROJECT..DATA.&MSTRFIL,
//             DISP=(OLD,KEEP)
//*
//* INPUT DATA SET - OPTION CARD
//*
//AQSOPTIN DD  DDNAME=OPTION,
//             DCB=BLKSIZE=80
//*
//* OUTPUT DATA SET - SORTED MASTER FILE
//*
//AQSOUTPT  DD UNIT=&TEMP,
```

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Figure 6.4.5-b. Cataloged Procedure AQRPM40

```
//              DISP=(NEW,PASS,DELETE),                                 00005900
//              SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),              00006000
//              DSN=&&MSTRSORT,                                         00006100
//              DCB=(RECFM=VB,LRECL=194,BLKSIZE=1556)                   00006200
//*                                                                     00006300
//* OUTPUT DATA SET - SUMMARY INFORMATION                               00006400
//*                                                                     00006500
//AQSPRINT  DD SYSOUT=&OUT                                              00006600
//*                                                                     00006700
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00006800
//*                                                                     00006900
//SYSPRINT  DD SYSOUT=&OUT                                              00007000
//*                                                                     00007100
//SYSOUT    DD SYSOUT=&OUT                                              00007200
//*                                                                     00007300
//SYSDBOUT  DD SYSOUT=&OUT                                              00007400
//*                                                                     00007500
//SYSDTERM  DD SYSOUT=&OUT                                              00007600
//*                                                                     00007700
//SYSUDUMP  DD SYSOUT=&OUT                                              00007800
//*                                                                     00007900
//*                                                                     00008000
//REPORT  EXEC PGM=&PROG2,                                              00008100
//              TIME=(&TIME2)                                           00008200
//*                                                                     00008300
//* LIST POLLUTANT INVENTORY                                            00008400
//*                                                                     00008500
//STEPLIB   DD DSN=&PROJECT..LOAD,                                      00008600
//              VOLUME=(PRIVATE,RETAIN),                                00008700
//              DISP=(SHR,PASS)                                         00008800
//*                                                                     00008900
//* INPUT DATA SET - SORTED MASTER FILE                                 00009000
//*                                                                     00009100
//AQSMASTR  DD DISP=(OLD,DELETE),                                       00009200
//              DSN=&&MSTRSORT                                          00009300
//*                                                                     00009400
//* INPUT DATA SET - PARAMETER FILE                                     00009500
//*                                                                     00009600
//AQSPRMFL  DD DISP=(OLD,KEEP),                                         00009700
//              DSN=&PROJECT..DATA.&PARMFIL                             00009800
//*                                                                     00009900
//* INPUT DATA SET - SITE FILE                                          00010000
//*                                                                     00010100
//AQSSITFL  DD DISP=(OLD,KEEP),                                         00010200
//              DSN=&PROJECT..DATA.&SITEFIL                             00010300
//*                                                                     00010400
//* OUTPUT DATA SET - POLLUTANT INVENTORY LISTING                       00010500
//*                                                                     00010600
//AQSPRTFL  DD SYSOUT=&OUT                                              00010700
//*                                                                     00010800
//* OUTPUT DATA SETS - SYSTEM OPERATION                                 00010900
//*                                                                     00011000
//SYSPRINT  DD SYSOUT=&OUT                                              00011100
//*                                                                     00011200
//SYSOUT    DD SYSOUT=&OUT                                              00011300
//*                                                                     00011400
//SYSDBOUT  DD SYSOUT=&OUT                                              00011500
//*                                                                     00011600
```

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Figure 6.4.5-b - continued. Cataloged Procedure AQRPM40

```
//SYSDTERM  DD SYSOUT=&OUT                                                00011700
//*                                                                       00011800
//SYSUDUMP  DD SYSOUT=&OUT                                                00011900
//*                                                                       00012000
```

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Figure 6.4.5-b - continued. Cataloged Procedure AQRPM40

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names
PROG1	ASRMSTR	Program to sort master file
PROG2	ARPINVP	Program to produce pollutant inventory
MSTRFIL	AQMASTER	Lowest-level index of unsorted master file
PARMFIL	AQPARMFL	Lowest-level index of parameter file
SITEFIL	AQSITEFL	Lowest-level index of site file
SPCUNIT	TRK	Units in which space for all new files is to be allocated
PRIMARY	50	Primary space allocation for sorted master file
SECONDRY	20	Secondary space allocation for sorted master file
TEMP	SYSDA	Unit type for temporary work space
SORTSPC	50	Number of units to be allocated for the sort work space
OUT	A	SYSOUT class for all print files
TIME1	'1,0'	Time allocated for execution of ASRMSTR
TIME2	'1,0'	Time allocated for execution of ARPINVP

Figure 6.4.5-c. Substitutable Parameters for AQRPM40

6.4.6 MASTER FILE SUMMARY REPORT PROGRAM - ARPMSBR (AQ0300)

6.4.6.1 Description

ARPMSBR (AQ0300) produces a master file summary report. This summary report compacts the data from an input master or answer file into a report consisting of one line of information for all the records in each site-parameter combination for one year. Each line in the listing describes the particular data group in terms of the number, the range, and the average value of its readings.

6.4.6.2 File Formats

Input to ARPMSBR (AQ0300) consists of an AQDHS-II master or answer file. Refer to Figure 4.5.3-a for the master file record format.

The output produced by this program consists of the printed master file summary report and a printed diagnostic report. See Figure 6.4.6-a for a sample of the master file summary report and Figure 6.4.6-b for a sample of the diagnostic report.

6.4.6.3 Options

There are no options.

6.4.6.4 Error Messages

There are no error messages.

6.4.6.5 Cataloged JCL

6.4.6.5.1 JCL listing - ARPMSBR (AQ0300) is executed by the cataloged procedure AQRPM30. See Figure 6.4.6-c for a listing of this procedure.

6.4.6.5.2 Cross-reference of DD names and files

Program Name: ARPMSBR (AQ0300)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master or answer file	Input
AQSPRINT	Master file summary report and diagnostic report	Output

6.4.6.5.3 User-supplied JCL - To execute the cataloged procedure AQRPM30, the user must supply the job accounting information and the data set name of the AQDHS-II master or answer file. See Figure 6.4.6-d for a description of the procedure's substitutable parameters.

6.4.6.5.4 Sample run stream - The following run stream from the AQDHS-II baseline test series would produce a master file summary report of the AQDHS-II master file 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.AQFINAL':

```
// EXEC  AQRPM30,
//       MSTRFIL=AQFINAL
```

6.4.6.6 Warnings and Special Instructions

No error conditions are checked by this program; however, for the report to represent a summary by year for each site-parameter combination, the input master or answer file must be in standard master file sort sequence (see Figure 5.6.2-f). If the master or answer file is not in standard sequence, it should be resorted by ASRMSTR (AQ0140) using the STND option prior to the execution of ARPMSBR (AQ0300). See Section 5.6.2 for information on ASRMSTR (AQ0140).

6.4.6.7 Cost Considerations

The following estimates are for the execution of ARPMSBR (AQ0300) on an IBM 370/168.

Number of master file records:	291 records
Output line count:	118 lines
Total number of readings:	2,937 readings
Total number of non-null readings:	2,546 readings
Non-null readings percentage:	87%
CPU time:	1.7 seconds
I/O time:	3.2 seconds
Total time:	4.9 seconds
Estimated cost:	$1.44

6.4.6.8 Related Programs and Procedures

There are no related programs or procedures.

```
                                    AIR QUALITY DATA REPORT  -  TOTALS BY YEAR FOR EACH SITE-PARAMETER GROUP                 PAGE     1

     SITE-KEY          YEAR   PARM-KEY     NBR OF      NBR OF          MIN            MAX           2ND           3RD           MEAN
                                            RDGS   NON-NULL RDGS                                    MAX           MAX
 1004910800001001E021   71   424011107      712         712          0.0000         2.4800        2.4800        2.0100        0.15087
 1206001400001003C011   73   611025014       24          24          2.0000         6.0000        5.0000        5.0000        3.33333
 2010800450001004B038   70   621012215       37           3         -1.2000        -0.5000       -1.1000       -1.2000       -0.93333
 3413617800003002G04C   60   435029101        1           1          2.3000         2.3000    **********    **********       2.30000
                        72   435029101        7           7          0.7000         4.6000        4.4000        3.9000        2.84286
                        73   435029101       29          29          0.2000         4.9000        4.9000        4.9000        3.02414
                        73   612023128        1           1         -1.3000        -1.3000    **********    **********      -1.30000
 3416621200001002A06A   73   426039907       10           1          0.0094         0.0094    **********    **********       0.00940
 3416621200001002A06B   72   435019202        4           4         10.1000        13.2000       12.8000       11.9000       12.00000
                        72   621032217        2           1         -1.0000        -1.0000    **********    **********      -1.00000
 3416909600001001A062   74   112018109       48          48          0.1000         4.5000        4.2000        4.2000        1.64583
 3416909600001001A063   74   211017190       96          96          0.0100         0.4500        0.4200        0.4200        0.16875
 3416909600001001A064   74   421011105       72          72          0.0010         0.0450        0.0420        0.0410        0.01606
 3416909600001001A065   74   421029105       48          48          0.0001         0.0042        0.0041        0.0041        0.00150
 3416909600001001A066   74   424013302       36          36          0.1000         4.2000        4.1000        4.1000        1.50000
 3416909600001001A067   74   426028207       24          24          0.0100         0.4100        0.4100        0.3700        0.14083
 3417028800002001D051   76   424011407      168         155         -0.0000      5840.0000        1.2000        0.8550       37.73848
 3417029800001004A06A   73   426039907       12          12          0.0021         0.0999        0.0999        0.0026        0.01865
 3417029800001004A068   76   111019101       79          14          6.0000       124.0000       81.0000       71.0000       53.14286
                        76   424019101       29           5          0.0000        28.0000        0.0000        0.0000        5.60000
                        77   111019101       44          28          0.0000       964.0000      455.0000      455.0000      400.64286
 3417104800001003A068   76   424019101      112          19          0.0000      1500.0000       21.6000        3.8000       80.73158
                        77   424019101       81          16          0.0000      9450.0000     1500.0000      361.3000      711.01250
 3718406000001234F058   71   111019101      326          93          7.0000       177.0000      168.0000      113.0000       54.79570
 3718630202260995A051   77   633011118     1392        1379          0.0000         1.4400        1.4300        1.4200        0.28236
 3718630203000997A05C   75   431021107        1           1          0.0400         0.0400    **********    **********       0.04000
 3718630203000997A051   74   431021107      168         168          0.0000         6.0000        5.0000        5.0000        1.66825
                        77   612022128       12          12         -1.0100         1.1700        0.9000        0.7900        0.25417
 3718630203000997A052   63   621012015       60          60          0.9000      9902.0000     9901.0000     9900.0000     2116.70106
```

Figure 6.4.6-a. Master File Summary Report (page 1 of 2)

```
                                  ARPMSBR (AQ0300) SUMMARY MESSAGES                                    PAGE    1

INPUT RECORD COUNT                         331
OUTPUT LINE COUNT:                          84
TOTAL NUMBER OF READINGS:                5,017
TOTAL NUMBER OF NON-NULL READINGS:       4,424
NON-NULL READINGS PERCENTAGE:              88%


PROGRAM NAME: ARPMSBR (AQ0300)
REVISION LEVEL: 1-00
LAST UPDATE #:  24
DATE INCORPORATED: OCTOBER 31, 1978
```

Figure 6.4.6-a - continued. Master File Summary Report (page 2 of 2)

```
                    AQDHS-II MASTER FILE SUMMARY REPORT PROGRAM  -  DIAGNOSTIC REPORT                    PAGE     1

PROGRAM NAME: ARPMSBR (AQ0300)
REVISION LEVEL: 1-00
LAST UPDATE #:  24
DATE INCORPORATED: OCTOBER 31, 1978
```

Figure 6.4.6-b. Diagnostic Report

```
//*
//*   PROCEDURE NAME: AQRPM30
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31,1978
//*
//*   THIS PROCEDURE ALLOWS THE USER TO GENERATE A SUMMARY REPORT FROM
//*   THE AQDHS-II MASTER FILE
//*
//*
//AQRPM30 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPMSBR,
//             MSTRFIL=AQMASTER,
//             TIME1='1,0',
//             OUT=A
//*
//REPORT  EXEC PGM=&PROGRAM,
//             REGION=150K,
//             TIME=(&TIME1)
//*
//* PRODUCE A SUMMARY REPORT FROM THE MASTER FILE
//*
//STEPLIB   DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//          DD DSNAME=SYS1.COBLIB,
//             DISP=(SHR,PASS)
//*
//* INPUT DATA SET - MASTER FILE
//*
//AQSMASTR  DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - BRIEF REPORT LISTING
//*
//AQSPRINT  DD SYSOUT=&OUT
//*
//* OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT  DD SYSOUT=&OUT
//*
//SYSOUT    DD SYSOUT=&OUT
//*
//SYSDBOUT  DD SYSOUT=&OUT
//*
//SYSDTERM  DD SYSOUT=&OUT
//*
//SYSUDUMP  DD SYSOUT=&OUT
//*
```

Figure 6.4.6-c. Cataloged Procedure AQRPM30

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQMASTER would be the full data set name of the AQDHS-II master file)
PROGRAM	ARPMSBR	Master or answer file summary report program
MSTRFIL	AQMASTER	Lowest-level index of input master or answer file
TIME1	'1,0'	Time (minutes, seconds) allocated for execution of ARPMSBR
OUT	A	SYSOUT class for all print files

Figure 6.4.6-d. Substitutable Parameters for AQRPM30

6.4.7 PARAMETER EXCEPTION REPORT PROGRAM - ARPPMEX (AQ0330)

6.4.7.1 Description

ARPPMEX (AQ0330) produces an exception report of the parameter, method, and unit code combinations which are found in the master file but not in the parameter file. For those combinations not found in the parameter file, ARPPMEX (AQ0330) creates skeleton transactions which may be used to facilitate the addition of these exceptions to the parameter file.

It is necessary for certain fields to be filled in by the user before these transactions can be used as input to ASRPARM (AQ0150) and AEMPARM (AQ0070). Refer to the following sections for information on the skeleton transaction requirements.

6.4.7.2 File Formats

Input to ARPPMEX (AQ0330) consists of an AQDHS-II master file and its associated parameter file. See Figure 4.5.3-a for the master file format and Figure 4.2.2-c for the parameter file format.

ARPPMEX (AQ0330) produces three output files: a parameter exception report, a skeleton transaction file, and a diagnostic report. A sample of the parameter exception report is shown in Figure 6.4.7-a. It lists the parameter, method, and unit code combinations that were missing from the parameter file or simply indicates that none were missing.

A set of three skeleton transactions for each parameter exception found in the master file is created to aid the user in updating the parameter file. A complete set of transactions is needed to add one parameter, method, and unit code combination to the parameter file. The format of the skeleton transactions is shown in Figure 6.4.7-b. These transactions do not contain all the necessary information required for valid parameter file transactions. If the skeleton transactions are to be added to the parameter file, the user should supply the correct information for all of the blank fields in the skeleton transactions. However, only the following four fields are required to be filled in by the user: (1) the minimum detectable, (2) the decimal code, (3) the standard units code, and (4) the standard units conversion factor. Refer to Section 4.2.2 for specific information about valid parameter file transactions and how they are used with program, AEMPARM (AQ0070). A sample of the diagnostic report is shown in Figure 6.4.7-c.

6.4.7.3 Options

There are no options.

6.4.7.4 Error Messages

ARPPMEX 001 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARAMETER-TABLE SIZE

Meaning: The level 77 data field 'NBR-OF-PARMS' has been increased without increasing the size of the parameter table.

Action: See Appendix C for instructions on correctly increasing the size of the parameter table.

ARPPMEX 002 ABORT - PARMAMETER-TABLE AREA OVERFLOW

Meaning: Either the number of parameter file records exceeds the program's storage space as defined in the parameter table, or the size of the parameter table has been increased without increasing the value of the level 77 data field 'NBR-OF-PARMS'.

Action: See Appendix C for instructions on correctly making the necessary changes.

ARPPMEX 003 ABORT - EXCEPTION-PARAMETER-TABLE AREA OVERFLOW

Meaning: Either the number of new parameter, method, and unit code combinations exceeds the program's storage space as defined in the exception parameter table, or the size of the exception parameter table has been increased without increasing the value of the level 77 data field 'NBR-OF-EXCP'.

Action: See Appendix C for instructions on correctly making the necessary changes.

ARPPMEX 004 ABORT - LEVEL 77 DATA FIELD "NBR-OF-EXCP" INCREASED BEYOND EXCEPTION-PARAMETER-TABLE SIZE

Meaning: The level 77 data field 'NBR-OF-EXCP' has been increased without increasing the size of the exception parameter table.

Action: See Appendix C for instructions on correctly increasing the size of the exception parameter table.

6.4.7.5 Cataloged JCL

6.4.7.5.1 JCL listing - ARPPMEX (AQ0330) is executed by the cataloged procedure AQRPP20. See Figure 6.4.7-d for a listing of this procedure.

6.4.7.5.2 Cross-reference of DD names and files

Program Name: ARPPMEX (AQ0330)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSPARMS	AQDHS-II parameter file	Input
AQSREPRT	Parameter exception report	Output
AQSTRANS	Skeleton transaction file	Output
AQSPRINT	Diagnostic report	Output

6.4.7.5.3 User-supplied JCL - To execute procedure AQRPP20, the user must supply the job accounting information and the data set names of the AQDHS-II master file, the AQDHS-II parameter file, and the skeleton transaction file produced by ARPPMEX (AQ0330). See Figure 6.4.7-e for a description of the procedure's substitutable parameters.

6.4.7.5.4 Sample run stream - The following run stream would produce a skeleton transaction file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PARMSKTR'. The input master file is named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.FLAMSTR' and the input parameter file is named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.PARM11'.

```
// EXEC  AQRPP20,
//       MSTRFIL=FLAMSTR,
//       PARMFIL=PARM11,
//       SKELTRN=PARMSKTR
```

6.4.7.6 Warnings and Special Instructions

ARPPMEX (AQ0330) produces a skeleton transaction file of those parameter, method, and units code combinations which are found in the master file but are not currently in the parameter file. If the user wants to use these transactions to update the parameter file, certain fields must have the appropriate information filled in. Generally, it would be best if the user supplied the correct information for all of the blank fields in the skeleton transactions. However, there are only four fields which must be filled in by the user: (1) the minimum detectable, (2) the decimal code, (3) the standard units code, and (4) the standard units conversion factor.

It may not always be necessary to add the missing parameter, method, and unit code combinations to the parameter file. For example, the monitoring of a specific parameter may have been previously terminated, causing the user to delete that parameter from the parameter file. However, the data on the master file for that parameter could be retained on the master file and eventually archived. These parameters will be shown as exceptions where ARPPMEX (AQ0330) is run; however, there is no need to add them to the parameter file, unless the user wishes to produce reports using the description field portion of the parameter file.

The run will abort if the number of parameter file records or the number of parameter exceptions exceed the program's storage space. Refer to Appendix C for a detailed discussion of the program modifications required to increase this space.

6.4.7.7 Cost Considerations

The following estimates are for the execution of ARPPMEX (AQ0330) on an IBM 370/168:

Number of master file records:	8,479 records
Number of parameter file records:	100 records
Number of parameter exceptions:	5 exceptions
Number of skeleton transactions:	15 transactions
CPU time:	5.2 seconds
I/O time:	23.4 seconds
Total time:	28.6 seconds
Estimated cost:	$4.74

6.4.7.8 Related Programs and Procedures

Each transaction in the skeleton transaction file can be filled in and the completed file used as input to ASRPARM (AQ0150), the parameter file transaction sort program, and AEMPARM (AQ0070), the parameter file maintenance program. See Sections 4.2.1 and 4.2.2.

```
                          AQDHS-II PARAMETER EXCEPTION REPORT                                PAGE   1
                  LIST UF PARAMETERS MISSING FROM AQDHS-II PARAMETER FILE

PARAMETER CODE       METHOD CODE       UNIT CODE
    61202                21               28
```

Figure 6.4.7-a. Parameter Exception Report

Column #	Field Length	Description
1	1	Card Type (value is 1, 2, or 3)
2 - 6	5	Parameter Code
7 - 8	2	Method Code
9 - 10	2	Unit Code
11 - 79	69	Filler
80	1	Action Code (value is A)

Figure 6.4.7-b. Skeleton Transactions Format

```
                    AQDHS-II PARAMETER EXCEPTION REPORT PROGRAM  -  DIAGNOSTIC REPORT                PAGE   1

PROGRAM NAME: ARPPMEX (AQ0330)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
INCORPORATED: OCTOBER 31, 1978


NUMBER OF MASTER RECORDS READ:                   331
NUMBER OF PARM FILE RECORDS READ:                 89
NUMBER OF PARAMETER EXCEPTIONS:                    1
NUMBER OF PARM FILE TRANSACTIONS CREATED:          3
```

Figure 6.4.7-c. Diagnostic Report

```
//*
//*    PROCEDURE NAME: AQRPP20
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*    THIS PROCEDURE ALLOWS THE USER TO LIST THE PARAMETERS IN THE
//*    AQDHS-II MASTER FILE THAT DO NOT APPEAR ON THE AQDHS-II PARAMETER
//*    FILL
//*
//*
//AQRPP20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPPMEX,
//             TIME1='1,0',
//             REG=100K,
//             MSTRFIL=AQMASTER,
//             PARMFIL=AQPARMFL,
//             SKELTRN=PARMSKTR,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=10,
//             SECNDRY=10,
//             OUT=A
//COMPARE EXEC PGM=&PROGRAM,
//             REGION=&REG,
//             TIME=(&TIME1)
//*
//*            IDENTIFY MISSING PARAMETER CODES
//*
//STEPLIB  DD DSNAME=&PROJECT..LOAD,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - MASTER FILE
//*
//AQSMASTR DD DSNAME=&PROJECT..DATA.&MSTRFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  INPUT DATA SET - PARAMETER FILE
//*
//AQSPARMS DD DSNAME=&PROJECT..DATA.&PARMFIL,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//*
//*  OUTPUT DATA SET - SKELETON TRANSACTIONS
//*
//AQSTRANS DD UNIT=&UNIT,
//             VOLUME=(PRIVATE,RETAIN,SER=&SERIAL),
//             DISP=(&DISP),
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),
//             DSNAME=&PROJECT..DATA.&SKELTRN
//*
//*  OUTPUT DATA SET - EXCEPTION REPORT
//*
//AQSREPRT DD SYSOUT=&OUT
```

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Figure 6.4.7-d. Cataloged Procedure AQRPP20

```
//*                                                                       00005900
//*  OUTPUT DATA SET -  DIAGNOSTIC MESSAGES                               00006000
//*                                                                       00006100
//AQSPRINT DD SYSOUT=&OUT                                                 00006200
//*                                                                       00006300
//*  OUTPUT DATA SET - SYSTEM OPERATION                                   00006400
//*                                                                       00006500
//SYSPRINT DD SYSOUT=&OUT                                                 00006600
//*                                                                       00006700
//SYSUDUMP DD SYSOUT=&OUT                                                 00006800
//*                                                                       00006900
//SYSDBOUT DD SYSOUT=&OUT                                                 00007000
//*                                                                       00007100
//SYSDTERM DD SYSOUT=&OUT                                                 00007200
//*                                                                       00007300
//SYSOUT   DD SYSOUT=&OUT                                                 00007400
//*                                                                       00007500
```

(page 2 of 2)

Figure 6.4.7-d - continued. Cataloged Procedure AQRPP20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.A087.CDHS.HQ.AQS.DATA. AQMASTER is the full data set name of the AQDHS-II master file)
PROGRAM	ARPPMEX	Parameter exception report program
TIME1	'1,0'	Time (minutes, seconds) allocated for execution of ARPPMEX
REG	100K	Region allocated for execution of ARPPMEX
MSTRFIL	AQMASTER	Lowest-level index of input master file
PARMFIL	AQPARMFL	Lowest-level index of input parameter file
SKELTRN	PARMSKTR	Lowest-level index of output skeleton transaction file
UNIT	3330	Unit type to which skeleton transaction file is to be written
SERIAL	CDHSPK	Volume serial number of the volume to which skeleton transaction file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of skeleton transaction file
SPCUNIT	TRK	Units in which space for skeleton transaction file is to be allocated
PRIMARY	10	Primary space allocation for skeleton transaction file
SECNDRY	10	Secondary space allocation for skeleton transaction file
OUT	A	SYSOUT class for all print files

Figure 6.4.7-e. Substitutable Parameters for AQRPP20

6.4.8 SITE EXCEPTION REPORT PROGRAM - ARPSMEX (AQ0340)

6.4.8.1 Description

ARPSMEX (AQ0340) produces an exception report of those sites (i.e., state, area, site, agency, and project codes) which are in the master file but are not in the site file. A file containing skeleton transactions is created to facilitate updating the site file to include these site exceptions.

6.4.8.2 File Formats

Input to ARPSMEX (AQ0340) consists of an AQDHS-II master file, an AQDHS-II site file, and an option card.

Output consists of the printed site exception report, the skeleton transaction file, and a printed diagnostic report. See Figure 6.4.8-a for a sample exception report.

The format of the skeleton transactions is illustrated in Figure 6.4.8-b. Only the key fields (state, area, site, agency, and project codes) of the missing sites are included in the skeleton transactions. The remaining fields (AQCR, COUNTY, SLAMS-ID, and description) must be coded by the user before the skeleton transactions can be used to update the site file. For additional information on site file transactions, see Section 4.3.2.

The following statistics are included in the diagnostic report: (1) the number of master file records read, (2) the number of site file records read, (3) the number of skeleton transactions created, and (4) the number of missing sites printed in the site exception report. See Figure 6.4.8-c for a sample diagnostic report.

6.4.8.3 Options

The maximum number of lines per printed page can be specified by the user in card columns one and two of the option card. (Those users who use standard 11 X 14 inch output forms and have the ability to print eight lines per inch will find this option useful in reducing the amount of paper they use.) If no option card is entered, or an invalid line count is specified, a default of 62 lines per page is assumed. See Figure 6.4.8-d for the format of the option card.

6.4.8.4 Error Messages

ARPSMEX 001 CONDITIONAL - INVALID OPTION CARD - DEFAULT OPTION (62 LINES PER PAGE) ASSUMED.

Meaning: Either a non-numeric character or an integer less than 20 was specified in columns one through two of the option card. The default of 62 lines per page was assumed.

Action: None.

ARPSMEX 002 ABORT - EMPTY SITE FILE

Meaning: The input site file contains no records; therefore, the run was terminated.

Action: Specify a valid site file and resubmit the run.

ARPSMEX 003 ABORT - SITE FILE OVERFLOW

Meaning: The site file contains more records than the maximum allowed by the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size allowed for the site file.

ARPSMEX 004 ABORT - EMPTY MASTER FILE

Meaning: The input master file contains no records; therefore, the run was terminated.

Action: Specify a valid master file and resubmit the run.

ARPSMEX 005 ABORT - 'MISSING-SITE' TABLE OVERFLOW

Meaning: The number of missing sites exceeds the maximum allowed by the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size allowed for the site file.

ARPSMEX 006 ABORT - LEVEL 77 DATA FIELD 'NBR-OF-SITES' INCREASED BEYOND SITE-TABLE SIZE

Meaning: The limit for the number of records in the site file has been increased, but the working-storage allocation for the site table has not been increased correspondingly. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the site table.

ARPSMEX 007 ABORT - LEVEL 77 DATA FIELD 'MISSING-SITE-MAX' INCREASED BEYOND MISSING-SITE-TABLE SIZE

Meaning: The limit for the number of missing sites has been increased, but the working-storage allocation for the missing-site table has not been increased correspondingly. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the missing-site table.

6.4.8.5 Cataloged JCL

6.4.8.5.1 JCL listing - ARPSMEX (AQ0340) can be run by executing the cataloged procedure AQRPS20. See Figure 6.4.8-e for a listing of this procedure.

6.4.8.5.2 Cross-reference of DD names and files

Program Name: ARPSMEX (AQ0340)

DD Name	File Description	Input/Output
AQSMASTR	AQDHS-II master file	Input
AQSSITES	AQDHS-II site file	Input
AQSOPTIN	Option card file	Input
AQSPRINT	Exception report	Output
AQSDIAG	Diagnostic report	Output
AQSTRANS	Skeleton transaction file	Output

6.4.8.5.3 User-supplied JCL -To execute the cataloged procedure AQRPS20, the user must supply job accounting information; the data set names of the AQDHS-II master file, AQDHS-II site file, and skeleton transaction file; and an option card. See Figure 6.4.8-f for a description of the procedure's substitutable parameters.

6.4.8.5.4 Sample run stream - The following run stream would produce a skeleton transaction file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.SITESKTR' from the master file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.INMSTR' and the site file named 'CN.EPALMH.A087.CDHS.HQ.AQS.DATA.INSITE'. The site exception report generated by this run will have a maximum of 62 lines per page.

```
//  EXEC   AQRPS20,
//         MSTRFIL=INMSTR,
//         SITEFIL=INSITE,
//          SKELTRN=SITESKTR
//EXCPRP.OPTIONS DD *
62
/*
```

6.4.8.6 Warnings and Special Instructions

ARPSMEX (AQ0340), as released by NADB, can only accommodate a site file containing 200 or fewer records and can handle at most 200 site exceptions. If you require larger capacities, see Appendix C for the modifications which must be made to your source module for ARPSMEX (AQ0340).

If an option card is submitted, it must specify no fewer than 20 lines to be printed per page.

The site file is assumed to be in the correct sort sequence as generated by the site file maintenance program AEMSITE (AQ0080).

6.4.8.7 Cost Considerations

The following estimates are for executing ARPSMEX (AQ0340) on an IBM 370/168:

Size of AQDHS-II master file:	291 records
Size of AQDHS-II site file:	21 records
Size of exception report:	2 records
Size of skeleton transaction file:	2 records
CPU time:	.3 second
I/O time:	8.5 seconds
Total time:	8.8 seconds
Estimated cost:	$1.36

6.4.8.8 Related Programs and Procedures

Each skeleton transaction created by ARPSMEX (AQ0340) can be completed and the file used to update the AQDHS-II site file. See Section 4.3.2 for information on the site file maintenance program AEMSITE (AQ0080).

```
                        AQDHS-II SITE EXCEPTION REPORT                               PAGE   1
                    LIST OF SITES MISSING FROM AQDHS-II SITE FILE

      STATE CODE        AREA CODE        SITE CODE        AGENCY        PROJECT

          10              0001              001             E             02
```

Figure 6.4.8-a. Site Exception Report

Record Position	Field Length	Description	
1 - 2	2	State Code	Site Key
3 - 6	4	Area Code	
7 - 9	3	Site Code	
10	1	Agency Code	
11 - 12	2	Project Code	
13 - 15	3	AQCR Code	Information to be filled in by user
16 - 19	4	County Code	
20	1	SLAMS/NAMS ID	
21 - 80	60	Description	

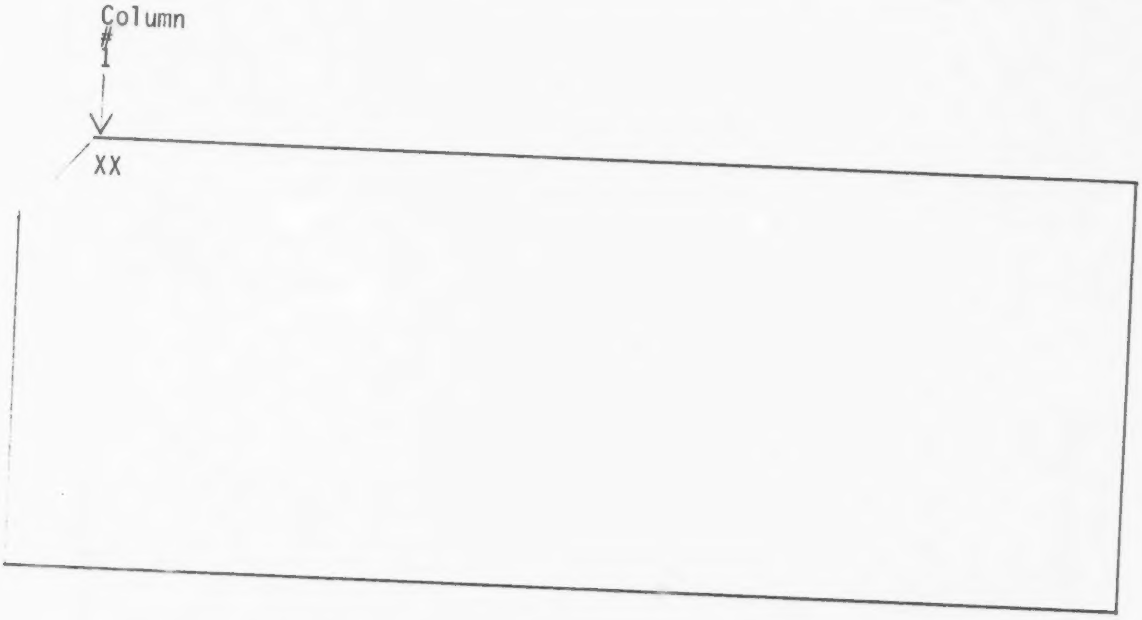
Figure 6.4.8-b. Site File Skeleton Transaction Format

```
                       AQDHS-II SITE EXCEPTION REPORT PROGRAM  -  DIAGNOSTIC REPORT                               PAGE    1
PROGRAM NAME: ARPSMEX (AQ0340)
REVISION LEVEL: 1-00
LAST UPDATE #: 24
DATE INCORPORATED: OCTOBER 31, 1978

OPTION IN EFFECT:    62 LINES PER PAGE


NUMBER OF MASTER FILE RECORDS:                        331
NUMBER OF SITE FILE RECORDS:                           36
NUMBER OF MISSING SITES PRINTED IN REPORT:              1
NUMBER OF SKELETON TRANSACTIONS GENERATED:              1
```

Figure 6.4.8-c. Diagnostic Report



XX specifies the maximum number of lines per printed page; it must be numeric and greater than or equal to 20

Figure 6.4.8-d. Option Card Format

```
//*
//*    PROCEDURE NAME: AQRPS20
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31,1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO LIST THE SITES IN THE AQDHS-II
//*    MASTER FILE THAT DO NOT APPEAR ON THE AQDHS-II SITE FILE
//*
//*
//AQRPS20 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PROGRAM=ARPSMEX,
//             REGION1=100K,
//             MSTRFIL=AQMASTER,
//             SITEFIL=AQSITEFL,
//             SKELTRN=SITESKTR,
//             OUT=A,
//             UNIT=3330,
//             SERIAL=CDHSPK,
//             DISP='NEW,CATLG,DELETE',
//             SPCUNIT=TRK,
//             PRIMARY=10,
//             SECNDRY=10,
//             TIME1='1,0'
//EXCPRP  EXEC PGM=&PROGRAM,
//             TIME=(&TIME1),
//             REGION=&REGION1
//*
//*  PRODUCE SITE EXCEPTIONS REPORT
//*
//STEPLIB DD   DSN=&PROJECT..LOAD,
//             DISP=(SHR,PASS),
//             VOLUME=(PRIVATE,RETAIN)
//*
//*  INPUT DATA SET - MASTER FILE
//*
//AQSMASTR  DD DSN=&PROJECT..DATA.&MSTRFIL,
//             DISP=(SHR,PASS),
//             VOLUME=(PRIVATE,RETAIN)
//*
//*  INPUT DATA SET - SITE FILE
//*
//AQSSITES  DD DSN=&PROJECT..DATA.&SITEFIL,
//             DISP=(SHR,PASS),
//             VOLUME=(PRIVATE,RETAIN)
//*
//*  INPUT DATA SET - OPTIONS CARD
//*
//AQSOPTIN  DD DDNAME=OPTIONS,
//             DCB=BLKSIZE=80
//*
//*  OUTPUT DATA SET - DIAGNOSITC MESSAGES
//*
//AQSDIAG  DD  SYSOUT=&OUT
//*
//*  OUTPUT DATA SET - LISTING OF MISSING SITES
//*
```

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Figure 6.4.8-e. Cataloged Procedure AQRPS20

```
//AQSPRINT DD  SYSOUT=&OUT                                              00005900
//*                                                                     00006000
//*  OUTPUT DATA SET - SITE TRANSACTIONS GENERATED                      00006100
//*                    FOR MISSING SITES                                00006200
//*                                                                     00006300
//AQSTRANS DD  UNIT=&UNIT,                                              00006400
//             VOL=(PRIVATE,RETAIN,SER=&SERIAL),                        00006500
//             DISP=(&DISP),                                            00006600
//             SPACE=(&SPCUNIT,(&PRIMARY,&SECNDRY),RLSE),               00006700
//             DSN=&PROJECT..DATA.&SKELTRN                              00006800
//*                                                                     00006900
//*  OUTPUT DATA SETS - SYSTEM OPERATION                                00007000
//*                                                                     00007100
//SYSPRINT DD  SYSOUT=&OUT                                              00007200
//*                                                                     00007300
//SYSOUT   DD  SYSOUT=&OUT                                              00007400
//*                                                                     00007500
//SYSDBOUT DD  SYSOUT=&OUT                                              00007600
//*                                                                     00007700
//SYSDTERM DD  SYSOUT=&OUT                                              00007800
//*                                                                     00007900
//SYSUDUMP DD  SYSOUT=&OUT                                              00008000
//*                                                                     00008100
```

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Figure 6.4.8-e - continued. Cataloged Procedure AQRPS20

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087. CDHS.HQ.AQS'	Highest-level index of data set names (e.g., CN.EPALMH.AD87.CDHS.HQ.AQS. AQMASTER would be the full data set name of the AQDHS-II master file)
PROGRAM	ARPSMEX	Site exception report program
REGION1	100K	Region size allocated for execution of ARPSMEX
MSTRFIL	AQMASTER	Lowest-level index of master file
SITEFIL	AQSITEFL	Lowest-level index of site file
SKELTRN	SITESKTR	Lowest-level index of skeleton transaction file
OUT	A	SYSOUT class for all print files
UNIT	3330	Unit type to which skeleton transaction file is to be written
SERIAL	CDHSPK	Volume ID to which skeleton transaction file is to be written
DISP	'NEW,CATLG,DELETE'	Disposition of skeleton transaction file
SPCUNIT	TRK	Units in which space for skeleton transaction file is to be allocated
PRIMARY	10	Primary space allocation for skeleton transaction file
SECNDRY	10	Secondary space allocation for skeleton transaction file
TIME1	'1,0'	Time allocated for the execution of ARPSMEX

Figure 6.4.8-f. Substitutable Parameters for AQRPS20

7.0 INTER-FUNCTIONAL PROCEDURES

7.1 INTRODUCTION

This section provides examples of run streams from the AQDHS-II baseline test run series in which more than one function is performed. The examples are discussed briefly and figures showing the run streams are provided. References are given to specific sections in the Users Guide for more detailed information on the programs and procedures. The primary emphasis of this section is to demonstrate how various functions can be linked together in a single job to accomplish a desired result (by executing several AQDHS-II Procedures).

7.2 EXAMPLES

7.2.1 RETRIEVAL AND CONVERSION TO SAROAD TRANSACTIONS.

This retrieval is the same as that discussed in example 1 of Section 5.2.2.2. It is an in-line COBOL retrieval which changes all sent status flags to add. Such a retrieval might be done if the SAROAD transactions had been previously sent, but were requested again. If all records on the AQDHS-II master file are flagged as sent, none would be converted to SAROAD transactions by ARPSARD (AQ0220), the AQDHS-II to SAROAD conversion program. Thus, a retrieval must be run to change the flags for the requested records.

Once this retrieval has been run, the answer file is input to ARPSARD (AQ0220). An option date of 7912 is used to insure that no 1980 or later data is sent to SAROAD, since in this example only the 1979 data is desired.

Information on the retrieval can be found in Section 5.2 and information on the retrieval procedure AQRTM10 in Section 5.7.1. Information on ARPSARD (AQ0220) can be found in Section 6.3.2.

Figure 7.2-a shows the run stream for this example. Note that AQMST04T is the input master file and TEMPRETR is the retrieved answer file. TEMPSARD is the output master file and would be used as the current, working master file since it reflects the latest SAROAD submission status.

7.2.2 RETRIEVAL AND ANOMALY SCREENING

This retrieval is the same as that discussed in example 2 of Section 5.2.2.2. It uses COBOL statements stored in a copy member to change both reading and record status flags from screened to not screened. This will allow all records to be screened for anomalies even though they may have been screened previously.

Once the retrieval has been run, the answer file is input to the anomaly screening procedure, AQRPM45. An option of FLAG LOW is used for the screening.

Information on the retrieval can be found in Section 5.2 and information on the retrieval procedure AQRTM10 in Section 5.7.1. Information on anomaly screening can be found in Sections 5.5.5, 6.4.1 and 6.4.3.

Figure 7.2-b shows the run stream for this example. Note that AQMST04T is the input master file, AQPARM01 is the input parameter file, and TEMPRETR is the retrieved answer file. SAVESCRN is the output master file and would be used as the current, working master file since it reflects the latest anomaly screening status. The COBOL copy member COPYEXM2 is shown in Figure 7.2-C.

7.2.3 ARCHIVAL AND MERGING

It is economically advantageous to keep only volatile data in the AQDHS-II master file. Once the data for a year has become static, that data should be removed from the master file, and may be added to a previously archived master file. This may be done by running the master file archival program, AMSARCH (AQ0215) and then using the master file merge program, AMSMERG (AQ0210), to merge the archived data with the previously archived file. AMSARCH (AQ0215) is executed by the cataloged procedure AQMSM20 and AMSMERG (AQ0210) is executed by cataloged procedure AQMSM10.

Information on AMSARCH (AQ0215) is found in Section 5.4.3 and information on AMSMERG (AQ0210) in Section 5.4.2.

Figure 7.2-d shows the run stream for this example. The year 1966 was used for the archival. Note that file AQARCM1A is archived from the input master file AQMST03T and is then merged with the existing archived file AQARCM01. The resulting two files are the working master file AQMST04T (from the archival job step) and the archived file AQARCM02 (from the merge job step).

7.2.4. RETRIEVAL FROM TWO FILES, MERGING, AND INVENTORY BY POLLUTANT

When data is stored in both a working master file and an archived file, it may be necessary to report on data stored in both files. This may be done by retrieving data from both files, merging the two answer files, and using the merged file for the report.

The desired result of this example is an inventory by pollutant report on all hourly data with units code 01 (micrograms/cubic meter at 25^0 C, 1013 millibars) where at least some of the data exceeds the maximum values for TSP (11101) of 2000 $\mu g/m^3$ and for SO_2 (42401) of 5240 $\mu g/m^3$. Since all such data is required, it should be retrieved from both the current and the archived master files. As the same retrieval will be used on both files, the cataloged procedures AQRTM20 and AQRTM30 will be used so that the generated retrieval load module can be saved and only the execution of the generated retrieval load module need be performed twice. Information on AQRTM20 is found in Section 5.2.2.5 and information on AQRTM30 in Section 5.2.3.5.

The procedure AQMSM10, which executes AQSMERG (AQ0210), is used to merge the two answer files. Information on the master file merge program, AQSMERG (AQ0210) is found in Section 5.4.2.

The procedure AQRPM40 which is used to produce the inventory by pollutant report executes the master file sort program, ASRMSTR (AQ0140) as well as the inventory by pollutant report program, ARPINVP (AQ0290). With the PARM option used for the sort, the report will contain all TSP data followed by all SO_2 data. Information on ARPINVP (AQ0290) is found in Section 6.4.5, and information on ASRMSTR (AQ0140) in Section 5.6.2.

Figure 7.2-e shows the run stream for this example. Note that ARCHRETR is the answer file retrieved from the archived file AQARCM02 and ACTVRETR is the answer file from the current master file AQMST04T. These two answer files are merged to produce the file MERGRETR from which the inventory by pollutant report is produced. The parameter file AQPARM01 and the site file AQSITE01 are used to provide headings for the report.

7.2.5 RETRIEVAL, CONVERSION TO USER UNITS CODE, AND DETAILED REPORT

The units code conversion program ACVUNIT (AQ0050) is used when reports are desired in either standard units or in user-specified units. The file used may be a retrieved answer file, as in the example shown here.

Data for the year 1979 for the parameters nitrogen dioxide (42602) or oxides of nitrogen (42603) are retrieved as in example 4 of Section 5.2.2.2.1.

The answer file from this retrieval is then input to the units code conversion program, ACVUNIT (AQ0050), using the USER option. This program will change the units code of each record to the units code specified by the user units code in the parameter file for that parameter. Each reading will then be multiplied by the user units conversion factor from the parameter file to reflect the change in the units code. If no user units code has been specified in the parameter file, the units code and readings will not be converted, but will remain the same as entered. Information on ACVUNIT (AQ0050) can be found in section 5.5.6. ACVUNIT (AQ0050) is executed by procedure AQCVM20.

The master file detailed report program, ARPMSTR (AQ0230), is then run on the file with the converted readings. The SUM option and DISPLAY > - 10 are used. Information on ARPMSTR (AQ0230), can be found in Section 6.2.3. Procedure AQRPM20 executes ARPMSTR (AQ0230).

Note that since the units code is part of the key for the AQDHS-II master file, running ACVUNIT (AQ0050), which alters the units codes, could result in the output file being out of master file sequence or having duplicate records. The master file sort program, ASRMSTR (AQ0140), should be run following ACVUNIT (AQ0050) to insure that the file is printed in correct sequence. See Section 5.6.2 for information on ASRMSTR (AQ0140). The sort was not run for this example.

Figure 7.2.-f shows the run stream for this example. Note that TEMPRETR is the file retrieved from the master file AQMST04T and is converted by ACVUNIT (AQ0050) to the file UNITCONV, using the parameter file AQPARM01. This same parameter file, the site file AQSITE01, and the parameter standards file AQSTND01 are used to provide information for the headings of the detailed report of UNITCONV.

7.2.6 SLIDING RETRIEVAL, SLIDING AVERAGE CALCULATION, AND SLIDING AVERAGE REPORT

At least three procedures must be run to produce a sliding average report. These are the retrieval procedures, AQRTM10 (or alternatively the procedures AQRTM20 and AQRTM30), the sliding average procedure, AQSTM20, and the detailed master file report procedure AQRPM20.

A retrieval using the SLIDING option must be run prior to executing the sliding average program, ASTSLAV (AQ0180). The retrieval shown here, for hourly data of SO_2 (42401) with the year not less than 1978, is the same as that discussed in example 5 of Section 5.2.2.2.1. Information on the retrieval can be found in Section 5.2.

Information on ASTSLAV (AQ0180) can be found in Section 5.3.4. In this example, an interval of eight and the SAROAD option are used.

The master file detailed report program, ARPMSTR (AQ0230) prints a sliding average report when a sliding average value file is input. No summary (MEAN or SUM) option may be entered, but a display option can be specified. In this example, DISPLAY < .9, is specified. Information on ARPMSTR (AQ0230) can be found in Section 6.2.3.

Figure 7.2-g shows the run stream for this example. Note that TEMPRETR is the answer file retrieved from the master file AQMST04T and is input to the sliding average program to produce the sliding average values file TEMPSLAV. TEMPSLAV is then listed by the master file detailed report program using the parameter file AQPARM01, the site file AQSITE01, and the parameter standards file AQSTND01.

7.2.7 BATCHED RETRIEVAL, SORT, AND STATISTICAL ANALYSIS

A statistical analysis is produced using procedure AQRPM45. The file being analyzed had been retrieved using a batched retrieval and was sorted using the master file sort procedure AQSRM10 prior to producing the statistical analysis.

A batched retrieval is run similiar to example 1 of Section 5.2.2.2.3. Data is selected for three separate sets of retrieval specifications, all for the first quarter of 1979, but batch one contains hourly data for TSP (11101), batch two contains hourly data for SO_2, and batch three contains all data for NO_x.

A batched answer file must be sorted using the BATCH option of the master file sort program prior to being input to any other programs. Also, any file should be sorted using the STAT option prior to being input to the statistical analysis. Both of these options can be specified in the same execution of the master file sort program, ASRMSTR (AQ0140). Information on ASRMSTR (AQ0140) can be found in Section 5.6.2.

The QUARTER option is used for the statistical analysis. Information on the statistical analysis can be found in Sections 5.3 and 6.4.2.

Figure 7.2-h shows the run stream for this example. Note that TEMPRETR is the answer file retrieved from the master file AQMST04T. This answer file is sorted to produce the file TEMPSORT, which is input to the statistical analysis procedure. The parameter file AQPARM01 is used in the statistical analysis and, along with the site file AQSITE01 is used to create the statistical analysis report.

7.2.8 RETRIEVAL AND DETAILED REPORT

SO_2 (42401) data is tested to determine if the mean value for the record is greater than 1.0 parts per million (units code of 07). This is an elementary violation technique although it does not reflect the actual standard for SO_2. The retrieval procedure AQRTM10 is used followed by the master file detailed report procedure AQRPM20.

A retrieval using a user-defined subroutine and user-defined data is run in this example. As explained in Section 5.2, it is also required that a COBOL copy member and at least one AQDHS-II retrieval specification be used. This retrieval is the same as that in example 3 of Section 5.2.2.2.2.

The master file detailed report program ARPMSTR (AQ0230), is run using the MEAN option and DISPLAY N > 9990. Information on ARPMSTR can be found in Section 6.2.3.

Figure 7.2-i shows the run stream for this example. Note that TEMPRETR is the answer file retrieved from the master file AQMST04T. The parameter file AQPARM01, the site file AQSITE01, and the parameter standards file AQSTND01 are used for information for the headings of the detailed report. All three COBOL copy members used in this example are shown in Figure 7.2-j.

7.2.9 RETRIEVAL, SORT, AND STATISTICAL ANALYSIS

The statistical analysis procedure, AQRPM10 is run using the YEAR and BRIEF option. Data to be used was retrieved using AQRTM10, and then were sorted using the master file sort procedure, AQSRM10.

A retrieval is run to select data for January, 1979 and 1973. This retrieval is the same as that in example 2 of Section 5.2.2.2.1. Information on the retrieval can be found in Section 5.2.

The master file sort program, ASRMSTR (AQ0140), must be run using the STAT option prior to running the statistical analysis. Information on ASRMSTR (AQ0140) can be found in Section 5.6.2.

The YEAR and BRIEF options are used for the statistical analysis. Information on this can be found in Sections 5.3 and 6.4.2.

Figure 7.2-k shows the run stream for this example. Note that TEMPRETR is the answer file retrieved from the master file AQMST04T and is sorted to produce the file TEMPSORT. The statistical analysis is performed on TEMPSORT and the statistical analysis report is produced using the parameter file AQPARM01 and the site file AQSITE01.

7.2.10 SAROAD TO AQDHS-II CONVERSION AND MASTER FILE MAINTENANCE

Many users maintain their AQDHS-II master file using SAROAD transactions. This example converts these transactions to AQDHS-II transactions using the procedure AQCVT10. The procedure AQEMM10 is then run. This procedure edits and sorts the transactions, then updates the master file.

SAROAD transactions are converted to AQDHS-II format by the SAROAD to AQDHS-II Conversion Program, ACVSARD (AQ0010). ACVSARD (AQ0010) is invoked by the cataloged procedure AQCVT10. Information on ACVSARD (AQ0010) can be found in Section 5.5.2. and information on ACQVT10 in Section 5.5.2.5.

The converted transactions are used to update the AQDHS-II master file by executing the cataloged procedure AQEMM10. Information on master file maintenance can be found in Section 4.1.4 and information on AQEMM10 is Section 4.6.1.

Figure 7.2-1 shows the run stream for this example. The LIST option is used in the SAROAD to AQDHS-II conversion step and the default options are used in the master file maintenance step. The converted transactions are stored in the temporary file &&AQTRANS. AQMST04T is the old master file; AQPARM01 is the input parameter file; AQSITE01 is the input site file; and AH11MSTR is the new, updated master file.

```
//ADHOC01A EXEC AQRTM10,
//             MSTRFIL=AQMST04T,
//             ANSWRFL=TEMPRETR,
//             PRIMARY=1,
//             SECNDRY=1
//COMPILE,INPUT DD *
$$SELECT USER
           GO TO USER-PARAGRAPH.
         USER-REPEAT.
           IF DATA-FIELD (SUB) IS NOT EQUAL TO 9999
             IF STATUS-FLAG (SUB) IS EQUAL TO 'S' OR
                 STATUS-FLAG (SUB) IS EQUAL TO 'C'
               MOVE 'A' TO STATUS-FLAG (SUB)
             ELSE
               IF STATUS-FLAG (SUB) IS EQUAL TO 'T' OR
                   STATUS-FLAG (SUB) IS EQUAL TO 'D'
                 MOVE 'B' TO STATUS-FLAG (SUB).
           ADD 1 TO SUB.
         USER-REPEAT-END.
           EXIT.

         USER-PARAGRAPH.
           MOVE TRUE TO RECORD-QUALIFIES-SW.
           IF YEAR IS EQUAL TO '79'
             MOVE 1 TO SUB
             PERFORM USER-REPEAT THRU USER-REPEAT-END
                 NBR-OF-READINGS TIMES
             IF RECORD-STATUS-FLAG IS EQUAL TO 'S'
               MOVE 'N' TO RECORD-STATUS-FLAG
             ELSE
               IF RECORD-STATUS-FLAG IS EQUAL TO 'T'
                 MOVE 'V' TO RECORD-STATUS-FLAG.
         USER-PARAGRAPH-END.
           EXIT.
$$END
/*
//ADHOC01B EXEC AQRPM05,
//             OLDMSTR=TEMPRETR,
//             NEWMSTR=TEMPSARD,
//             DISP1='NEW,PASS',
//             PRIMARY=1,
//             SECNDRY=1
```

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Figure 7.2-a. Example 7.2.1 - Run Stream

```
//SUBMIT.AQSADDFL DD SYSOUT=A
//SUBMIT.AQSCHGFL DD SYSOUT=A
//SUBMIT.OPTION DD *
7912
/*
```

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Figure 7.2-a - continued. Example 7.2.1 - Run Stream

```
//ADHOC02A EXEC AQRTM10,
//              MSTRFIL=AQMST04T,
//              ANSWRFL=TEMPRETR,
//              PRIMARY=1,
//              SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT USER  COPYEXM2
$$END
/*
//ADHOC02B EXEC AQRPM45,
//              OLDMSTR=TEMPRETR,
//              NEWMSTR=SAVESCRN,
//              PARMFIL=AQPARM01,
//              TIME1=3,
//              PRI1=1,
//              SEC1=1,
//              PRI2=1,
//              SEC2=1,
//              PRI3=1,
//              SEC3=1
//CONVERT.AQSANOMF DD DSN=RTI.C44.PO2069.MCMASTER.DPR.DATA.FORTANOM,
// DISP=(NEW,CATLG,DELETE),UNIT=DISK,VOL=SER=RTI777,SPACE=(TRK,(1,1))
//CONVERT.OPTIONS DD *
FLAG LOW
/*
//REPORT.FT09F001 DD DISP=OLD,
// DSN=RTI.C44.PO2069.MCMASTER.DPR.DATA.FORTANOM
//REPORT.FT10F001 DD SYSOUT=A
```

Figure 7.2-b. Example 7.2.2 - Run Stream

```
    GO TO USER-PARAGRAPH.
USER-REPEAT.
    IF DATA-FIELD (SUB) NOT EQUAL TO 9999
      IF STATUS-FLAG (SUB) EQUAL TO 'B'
        MOVE 'A' TO STATUS-FLAG (SUB)
      ELSE
        IF STATUS-FLAG (SUB) EQUAL TO 'D'
          MOVE 'C' TO STATUS-FLAG (SUB)
        ELSE
          IF STATUS-FLAG (SUB) EQUAL TO 'T'
            MOVE 'S' TO STATUS-FLAG (SUB).
    ADD BINARY-1 TO SUB.
USER-REPEAT-END.
    EXIT.
USER-PARAGRAPH.
    MOVE TRUE TO RECORD-QUALIFIES-SW.
    MOVE BINARY-1 TO SUB.
    PERFORM USER-REPEAT THRU USER-REPEAT-END
        NBR-OF-READINGS TIMES.
    IF RECORD-STATUS-FLAG EQUAL TO 'T'
      MOVE 'S' TO RECORD-STATUS-FLAG
    ELSE
      IF RECORD-STATUS-FLAG EQUAL TO 'V'
        MOVE 'N' TO RECORD-STATUS-FLAG.
USER-PARAGRAPH-END.
    EXIT.
```

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Figure 7.2-c. Example 7.2.2 - COBOL copy member COPYEXM2

```
//TEST26A EXEC AQMSM20,
//              MSTRFIL=AQMST03T,
//              NEWMSTR=AQMST04T,
//              ARCMSTR=AQARCM1A,
//              PRIMARY=1,
//              SECNDRY=1
//ARCHIVE.OPTIONS DD *
66
/*
//TEST26B EXEC AQMSM10,
//              NEWMSTR=AQARCM02,
//              INFILE1=AQARCM01,
//              INFILE2=AQARCM1A,
//              ALLOC='TRK,(1,1)',
//              DISP1='OLD,DELETE,KEEP',
//              DISP2='OLD,DELETE,KEEP'
```

Figure 7.2-d. Example 7.2.3 - Run Stream

```
//ADHOC03A EXEC AQRTM20,
//              PGMSAVE=RETRVR
//COMPILE.INPUT DD *
$$SELECT                                                        RETRVR
((PARAMETER-CODE          = '11101'                                     AND
DATA-FIELD                > '2000')                                     OR
(PARAMETER-CODE           = '42401'                                     AND
DATA-FIELD                > '5240'))                                    AND
TIME-CODE                 = '1'                                         AND
DATA-FIELD                < '9999'                                      AND
UNIT-CODE                 = '01'
$$END
/*
//ADHOC03B EXEC AQRTM30,
//              PROGRAM=RETRVR,
//              MSTRFIL=AQARCM02,
//              ANSWRFL=ARCHRETR,
//              DISP='NEW,PASS',
//              PRIMARY=1,
//              SECNDRY=1
//ADHOC03C EXEC AQRTM30,
//              PROGRAM=RETRVR,
//              MSTRFIL=AQMST04T,
//              ANSWRFL=ACTVRETR,
//              DISP='NEW,PASS',
//              PRIMARY=1,
//              SECNDRY=1
//ADHOC03D EXEC AQMSM10,
//              INFILE1=ARCHRETR,
//              INFILE2=ACTVRETR,
//              NEWMSTR=MERGRETR,
//              ALLOC='TRK,(1,1)'
//ADHOC03E EXEC AQRPM40,
//              MSTRFIL=MERGRETR,
//              PARMFIL=AQPARM01,
//              SITEFIL=AQSITE01
//SORT.OPTION DD *
      PARM
/*
```

Figure 7.2-e. Example 7.2.4 - Run Stream

```
//ADHOC04A EXEC AQRTM10,
//             MSTRFIL=AQMST04T,
//             ANSWRFL=TEMPRETR,
//             PRIMARY=1,
//             SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT
YEAR                     = '79'                                     AND
(PARAMETER-CODE          = '42602'                                  OR
PARAMETER-CODE           = '42603')
$$END
/*
//ADHOC04B EXEC AQCVM20,
//             MSTRFIL=TEMPRETR,
//             ANSWRFL=UNITCONV,
//             PARMFIL=AQPARM01,
//             DISP='NEW,PASS',
//             PRIMARY=1,
//             SECNDRY=1
//CONV.OPTIONS DD *
USER
/*
//ADHOC04C EXEC AQRPM20,
//             MSTRFIL=UNITCONV,
//             PARMFIL=AQPARM01,
//             SITEFIL=AQSITE01,
//             STANFIL=AQSTND01
//REPORT.OPTIONS DD *
SUM DISPLAY > -10
/*
```

Figure 7.2-f. Example 7.2.5 - Run Stream

```
//ADHOC05A EXEC AQRTM10,
//             MSTRFIL=AQMST04T,
//             ANSWRFL=TEMPRETR,
//             PRIMARY=1,
//             SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT                SLIDING
YEAR                   N < '78'                                     AND
PARAMETER-CODE             = '42401'                                AND
TIME-CODE                  = '1'
$$END
/*
//ADHOC05B EXEC AQSTM20,
//             ANSRFIL=TEMPRETR,
//             VALUFIL=TEMPSLAV,
//             PRIMARY=1,
//             SECNDRY=1
//AVERAGE.OPTIONS DD *
AVERAGE 8           S
/*
//ADHOC05C EXEC AQRPM20,
//             MSTRFIL=TEMPSLAV,
//             PARMFIL=AQPARM01,
//             SITEFIL=AQSITE01,
//             STANFIL=AQSTND01
//REPORT.OPTIONS DD *
DISPLAY < .9
/*
```

Figure 7.2-g. Example 7.2.6 - Run Stream

```
//ADHOC06A EXEC AQRTM10,
//             MSTRFIL=AQMST04T,
//             ANSWRFL=TEMPRETR,
//             PRIMARY=1,
//             SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT
YEAR                      = '79'                                           AND
MONTH                     < '04'                                           AND
PARAMETER-CODE            = '11101'                                        AND
TIME-CODE                 = '1'
$$SELECT
YEAR                      = '79'                                           AND
MONTH                     < '04'                                           AND
PARAMETER-CODE            = '42401'                                        AND
TIME-CODE                 = '1'
$$SELECT
YEAR                      = '79'                                           AND
MONTH                     < '04'                                           AND
PARAMETER-CODE            = '42603'
$$END
/*
//ADHOC06B EXEC AQSRM10,
//             MSTRFIL=TEMPRETR,
//             SORTFIL=TEMPSORT,
//             PRIMARY=1,
//             SECNDRY=1
//SORT.OPTIONS DD *
BATCH STAT
/*
//ADHOC06C EXEC AQRPM10,
//             MSTRFIL=TEMPSORT,
//             PARMFIL=AQPARM01,
//             SITEFIL=AQSITE01,
//             PRI1=1,
//             SEC1=1,
//             PRI2=1,
//             SEC2=1
//PRELIM.OPTIONS DD *
QUARTER
/*
//PRINTS.OPTIONS DD *
      60
```

Figure 7.2-h. Example 7.2.7 - Run Stream

```
//ADHOC07A EXEC AQRTM10,
//             MSTRFIL=AQMST04T,
//             ANSWRFL=TEMPRETR,
//             PRIMARY=1,
//             SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT       RPTEST03                  DTTEST03 RPTEST3A
YEAR                     = YEAR
$$END
/*
//ADHOC07B EXEC AQRPM20,
//             MSTRFIL=TEMPRETR,
//             PARMFIL=AQPARM01,
//             SITEFIL=AQSITE01,
//             STANFIL=AQSTND01
//REPORT.OPTIONS DD *
MEAN DISPLAY N > 9990
/*
```

Figure 7.2-i. Example 7.2.8 - Run Stream

Copy Member RPTEST03

```
MOVE FALSE TO RECORD-QUALIFIES-SW.
IF PARAMETER-CODE EQUAL TO '42401'
    AND UNIT-CODE EQUAL TO '07'
  MOVE ZERO TO USER-TOTAL-READING
               USER-AVG-READING
               USER-NBR
  MOVE BINARY-1 TO SUB
 PERFORM USER-CK THRU USER-CK-END NBR-OF-READINGS TIMES
  DIVIDE USER-TOTAL-READING BY USER-NBR
      GIVING USER-AVG-READING
  IF USER-AVG-READING IS GREATER THAN 1
    MOVE TRUE TO RECORD-QUALIFIES-SW.
```

Copy Member DTTEST03

```
01  USER-DATA-STRUCTURE.
    02  USER-TOTAL-READING   PIC S9(5)V9(4) VALUE +0.
    02  USER-AVG-READING     PIC S9(5)V9(4) VALUE +0.
    02  USER-NBR             PIC 99 VALUE 0.
    02  USER-DATA-FLD        PIC S9(4).
    02  USER-DATA-FLD0       REDEFINES
        USER-DATA-FLD        PIC S9(4).
    02  USER-DATA-FLD1       REDEFINES
        USER-DATA-FLD        PIC S999V9.
    02  USER-DATA-FLD2       REDEFINES
        USER-DATA-FLD        PIC S99V99.
    02  USER-DATA-FLD3       REDEFINES
        USER-DATA-FLD        PIC S9V999.
    02  USER-DATA-FLD4       REDEFINES
        USER-DATA-FLD        PIC SV9999.
    02  USER-DATA-FLDX       PIC S9(4)V9(4).
```

Copy Member RPTEST3A

```
USER-CK.
    MOVE DATA-FIELD (SUB) TO USER-DATA-FLD.
    IF DECIMAL-CODE (SUB) EQUAL TO 0
      MOVE USER-DATA-FLD0 TO USER-DATA-FLDX
    ELSE
      IF DECIMAL-CODE (SUB) EQUAL TO 1
        MOVE USER-DATA-FLD1 TO USER-DATA-FLDX
      ELSE
        IF DECIMAL-CODE (SUB) EQUAL TO 2
          MOVE USER-DATA-FLD2 TO USER-DATA-FLDX
        ELSE
          IF DECIMAL-CODE (SUB) EQUAL TO 3
            MOVE USER-DATA-FLD3 TO USER-DATA-FLDX
          ELSE
            MOVE USER-DATA-FLD4 TO USER-DATA-FLDX.
    IF USER-DATA-FLDX IS LESS THAN 9998
      ADD 1 TO USER-NBR
      ADD USER-DATA-FLDX TO USER-TOTAL-READING.
    ADD 1 TO SUB.
USER-CK-END.  EXIT.
```

Figure 7.2-j. Example 7.2.8 - COBOL Copy Members

```
//ADHOC08A EXEC AQRTM10,
//              MSTRFIL=AQMST04T,
//              ANSWRFL=TEMPRETR,
//              PRIMARY=1,
//              SECNDRY=1
//COMPILE.INPUT DD *
$$SELECT
YEAR
MONTH                      = '79'                            AND
YEAR                       = '01'                            OR
$$END                      = '73'
/*
//ADHOC8B  EXEC AQSRM10,
//              MSTRFIL=TEMPRETR,
//              SORTFIL=TEMPSORT,
//              PRIMARY=1,
//              SECNDRY=1
//SORT.OPTIONS  DD  *
     STAT
/*
//ADHOC08C EXEC AQRPM10,
//              MSTRFIL=TEMPSORT,
//              PARMFIL=AQPARM01,
//              SITEFIL=AQSITE01,
//              PRI1=1,
//              SEC1=1,
//              PRI2=1,
//              SEC2=1
//PRELIM.OPTIONS DD *
YEAR
/*
//PRINTS.OPTIONS DD *
BRIEF
/*
```

Figure 7.2-k. Example 7.2.9 - Run Stream

```
//ADHOC11A EXEC AQCVT10
//CONVERT.OPTIONS DD *
LIST
/*
//CONVERT.INPUT DD *
$2
/*
//CONVERT.OUTPUT DD DISP=(NEW,PASS),DSN=&&AQTRANS,UNIT=SYSDA,
// SPACE=(TRK,(10,1))
//ADHOC11B EXEC AQEMM10,
//             OLDMSTR=AQMST04T,
//             NEWMSTR=AH11MSTR,
//             PARMFIL=AQPARM01,
//             SITEFIL=AQSITE01,
//             PRIMARY=1,
//             SECNDRY=1
//EDIT.INPUT DD DISP=OLD,DSN=&&AQTRANS
```

Figure 7.2-1. Example 7.2.10 - Run Stream

8.0 JCL AND GENERAL TOPICS

8.1 IBM JCL

8.1.1 INTRODUCTION

This section discusses the IBM 360/370 OS JCL used in the baseline AQDHS-II subsystem. Those users who have other types of hardware and operating systems will have to modify or replace this JCL and should consult their systems personnel for specific instructions.

There are three basic types of IBM JCL statements necessary to run the AQDHS-II programs. These are the JOB, EXEC, and DD statements. All JCL statements follow a similar format: the first two columns of the card must contain slashes (//) to denote that the card is a JCL card; an optional name immediately follows the slashes and may be one to eight characters in length; the keyword (JOB, EXEC or DD) must be preceded and followed by at least one space. There are several fields of information specified in these statements, each field being separated from the preceding one by a comma. All of the information must be punched in columns 1-71. See Figure 8.1-a for an illustration of this format.

If a statement is too long to be punched on one card, the additional information can be punched on successive continuation cards. Each continuation card must contain slashes in columns 1 and 2 followed by at least one space. The information contained on the card must start between columns 4 through 16, inclusive. In addition, the last field on the preceding card must be followed by a comma.

There are three JCL statements that do not follow the general format. Information on these exceptions can be found in Section 8.1.5.

8.1.2 JOB CARD

A job is a group of JCL statements grouped together into a single run stream. The JOB card is the first of these statements, and it contains the accounting information and run parameters that the computer operating system must have to run the job. Each computer installation has its own standards for JOB card formats, but a sample format is shown in Figure 8.1-b. Some of the parameters mentioned here may not be allowed or may be specified differently at your installation. The user should consult his local computer systems personnel for details of the JOB card requirements at his installation. Each job card will generally contain for each keyword an equal sign and a value. Each field, except the last, must be followed by a comma. Figure 8.1-c gives a listing of frequently used information fields for JOB cards.

8.1.3 EXEC CARD

The EXEC card is used to specify the procedure or program to be executed. In AQDHS-II, all JCL to execute specific programs is included in cataloged procedures (see Section 8.1.6). More than one EXEC card can be included in a given job; for example, to run both a retrieval and a detailed report of the answer file, two EXEC cards would be used, one for the retrieval procedure AQRTM10 and one for the detailed report procedure AQRPM20.

The cataloged procedures in AQDHS-II contain substitutable parameters to indicate frequently changed information such as file names and storage information for new data sets. Values for these substitutable parameters are specified on the EXEC card. Information on the substitutable parameters for the cataloged procedures can be found in the program sections of this User's Guide.

8.1.4 DD CARD

The DD (Data Definition) card is used to define the data sets associated with a particular program's execution. The DD card provides information such as the data set name, the unit type (such as disk or tape), the volume where the data set resides, the disposition (is the data set old or new; should it be cataloged, kept, or deleted?). These DD cards are included in the cataloged procedures, with the most variable information (data set name, space allocation, disposition, etc.) specified by substitutable parameters. Fields that may be specified on the DD card are shown in Figure 8.1-d.

In some cases, the user will have to override one or more DD cards in a cataloged procedure. The cataloged procedures in AQDHS-II contain deferred DD names for many data sets to eliminate the necessity for overrides. The DD cards defining option cards and transaction files for AQDHS-II programs are examples of deferred DD names. For example, in the cataloged procedure AQRPM20 (see Section 6.2.3.5) which produces the master file detailed report, the DD card used to define the option card input to ARPMSTR (AQ0230) is as follows:

```
//AQSINPUT  DD  DDNAME=OPTIONS,
//              DCB=BLKSIZE=80
```

To run this procedure, a card must be entered into the run stream to further define this data set. The required card would be coded as follows:

```
//REPORT.OPTIONS DD *
```

Note that REPORT indicates the job step which executes ARPMSTR (AQ0230), OPTIONS indicates which data set is being defined, and the * indicates that data (in this case, the option card) will immediately follow the DD card in the run stream.

8.1.5 SPECIAL JCL CARDS

There are three special JCL cards: the in-line data set delimiter, the comment card, and the end-of-job card.

The special control card

```
/*
```

is used to indicate the end of an in-line data set, such as transactions, retrieval specifications, and option cards.

The comment card

```
//*  comment
```

may be used anywhere in the run stream after the JOB card.

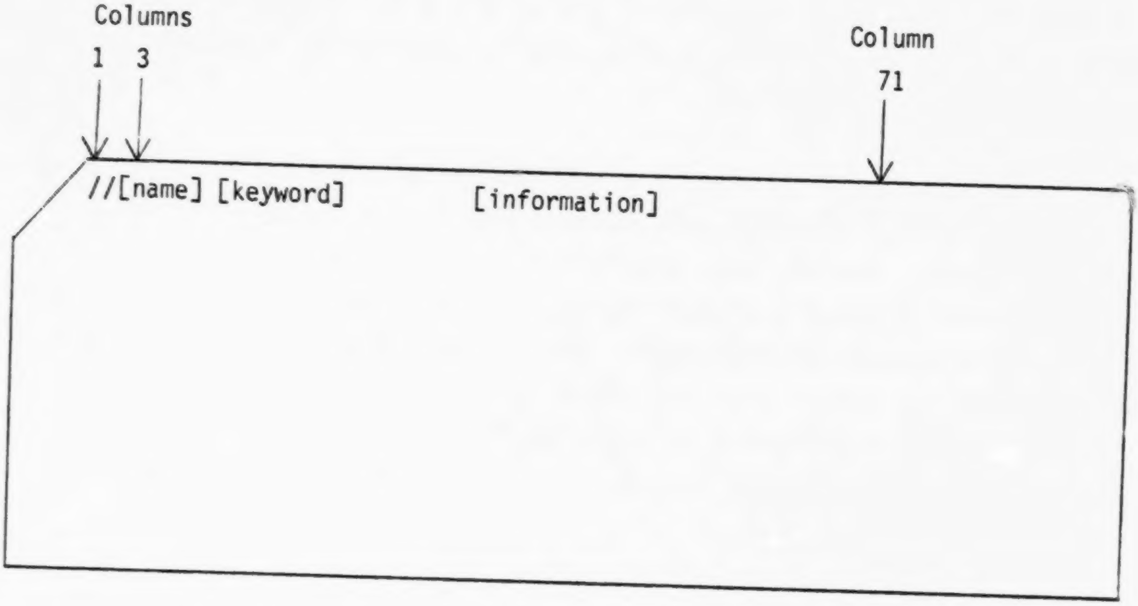
The // card is used to denote the end of a job.

Some installations also require an end-of-file card, but there is no standard format for it.

8.1.6 CATALOGED PROCEDURES

With the JCL cards described above (JOB, EXEC, DD), it is possible to write all of the control language statements necessary to run the AQDHS-II programs. For example, over 200 control statements are required to run a retrieval. Since it would be very time consuming to code all of the JCL statements each time a program is run, and since there would also be a great possibility for errors, the JCL to run the AQDHS-II programs has been organized into procedures. These procedures are cataloged in a systems library and may be executed by using only a few JCL control statements. The cataloged procedure which invokes an AQDHS-II program is discussed in the section relating to that program. A list of the substitutable parameters associated with the procedure, a brief discussion, and sample job streams are also provided in that section.

The procedures may be executed directly from the AQDHS-II JCL library, if a procedure library (PROCLIB) control card immediately follows the JOB card in the run stream. However, some installations may require that the procedures be copied into a system procedure library. In this case, no PROCLIB statement is needed to execute the procedures. The systems personnel at a particular installation can explain what that installation requires. Please note that if the procedures are executed from a systems procedure library, any updates to the AQDHS-II procedures must be made in both the AQDHS-II JCL library and the system library.



Name - one to eight characters

Keyword - DD, EXEC, JOB

Information - consists of several fields separated by commas

Figure 8.1-a. General Format of JCL Statement

```
//[job name] JOB  [accounting information],[name],[information]
```

Job name - name given to job by user. Must be one to eight characters in length and must begin in column 3

Accounting information - installation-dependent account number (consult the local systems personnel)

Name - name selected by user to identify run, 1 to 20 characters long

Information - see Figure 8.1-c

Figure 8.1-b. JOB Card Format

MSGLEVEL	Specifies whether all JCL cards should be listed or not.
PRTY	Specifies the job priority. These priorities are established by the installation; consult the local systems personnel for information.
CLASS	Specifies the job class to be used. Job classes determine the overall priority (and cost schedule) of the job. The user should consult the local systems personnel for information on classes used at his installation.
TIME	Specifies a time limit for the job. It may be given in minutes (e.g., TIME=3) or in minutes and seconds (e.g., TIME=(1,30)). If no value is specified, the installation's default value will be used. Consult the local systems personnel for information on the default value.

Figure 8.1-c. JOB Card Information Fields

DUMMY	This parameter is specified for the input master file when running file maintenance procedures to create initial files. DUMMY signifies that the data set is not present.
UNIT	Specifies the input/output unit. Disk units can be specified by DISK, 2314, 3330, etc., to denote the specific disk type used. Tapes may be specified by TAPE or 2400, etc. Consult the local systems personnel for specific information on the specifications.
DISP	Specifies the data set disposition. There are three positional subparameters within the DISP parameter: DISP=(current status, normal disposition, abnormal disposition). One of three values may be specified for current status: NEW, OLD, or SHR. Their meanings are as follows: NEW specifies that no data set with the specified name currently exists. OLD designates an existing data set and specifies that the step will be given sole access to the data set. SHR specifies an existing data set which may be shared with other jobs running at the same time. The normal disposition is used if the step proceeds to normal system completion; the abnormal disposition is used if the step has an abnormal system termination. Note that most ABORT errors in

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Figure 8.1-d. DD Card Field Specifications

AQDHS-II will cause the step to terminate prematurely, but will not cause a system ABORT, and therefore, the normal disposition is still in effect. The possible values for both dispositions are CATLG, KEEP, PASS, DELETE, and UNCATLG. Their meanings are as follows:

CATLG, generally used for new permanent data sets, specifies that the data set will be kept and that an entry will be made in the system catalog for that data set. Cataloged data sets may be referred to in later jobs by name and disposition only.

KEEP is used to indicate that a new permanent data set is to be kept but that no entry will be made in the system catalog. Data sets written with a disposition of KEEP must be referenced by complete DD information.

PASS is used to pass the data set to subsequent job steps. The use of PASS saves time, since the system retains the data set location and volume information, and the volume containing the data set remains mounted. PASS may be used for both temporary and permanent data sets.

DELETE deletes the data set and removes it from the catalog, if applicable.

UNCATLG removes the data set from the catalog, but does not delete it.

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Figure 8.1-d - continued. DD Card Field Specifications

VOL The volume parameter requests a specific volume, such as a tape reel or a disk pack. VOL must specify the volume serial number for a data set. It also may be used to specify that the volume is private, and that a mountable volume is to be retained. This is denoted by VOL=(PRIVATE,RETAIN,SER=XXXXXX) where XXXXXX is the six character volume serial number. If only the volume serial number is to be specified, VOL=SER=XXXXXX may be used.

LABEL Provides label information for the data set. AQDHS-II has been set up to specify all data sets as unlabeled. If this is not allowed at a particular installation, all programs in the system for that installation must be modified to reflect that the data sets are labeled. The user must consult NADB prior to making such a modification. Since tapes may contain more than one file, the file number is also specified in the LABEL parameter; i.e., LABEL=(file number, type). The value for type is NL for unlabeled data sets and SL for labeled data sets.

SPACE The space parameter is used on direct access (disk) volumes to indicate the amount of space to be allocated. Space may be allocated by tracks (TRK) or cylinders (CYL). Both a primary and a secondary allocation may be used if the primary space is exceeded, up to 15 times the secondary allocation may be used. To conserve space a release (RLSE) parameter may be coded. RLSE requests that only that space actually used for the data set be kept. As an example, to allocate ten primary and five secondary tracks with extra space released, the SPACE parameter would be coded as:

```
SPACE=(TRK,(10,5),RLSE).
```

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Figure 8.1-d - continued. DD Card Field Specifications

SYSOUT	Routes a data set to a specific device, such as a printer or a card punch. Standard values are A for printer, B for card punch. Consult the local systems personnel for installation values used to specify special forms, etc.
DCB	Specifies the data control block (DCB) parameters, such as the record and block sizes and record format. This information is not generally needed for AQDHS-II. The subparameters generally used are RECFM, LRECL, and BLKSIZE. They are described as follows: RECFM is used to specify the record format. Values used in AQDHS-II are V for variable-length records, F for fixed-length records, B for blocked records. The AQDHS-II master file has RECFM=VB; all other files for AQDHS-II have RECFM=FB. LRECL indicates the record length of the file. If needed, this information can be found on the particular file's record layout in the User's Guide. BLKSIZE is used to indicate the block size (in bytes). The number of records per block may be found in the data division of each AQDHS-II source program.

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Figure 8.1-d - continued. DD Card Field Specifications

8.2 UPDATES

8.2.1 INTRODUCTION

Changes are made to the AQDHS-II programs and procedures as necessary to provide additional capabilities such as new user-oriented reports; to meet changing EPA requirements, such as changes to EPA standards; and to correct program "bugs." Some past examples of enhancements include adding the ability to process negative data and adding a new program to merge two master files. A change in the transaction edit program was necessitated by a change in the EPA maximum value check for hydrocarbons. One program "bug" that has been corrected was the incorrect conversion of hourly data by the SAROAD to AQDHS-II transaction conversion program.

Whenever changes to the AQDHS-II subsystem are necessary, an update will be issued by EPA to make that change. The purpose of this and the following sections is to provide information on installing these updates.

8.2.2 GENERAL UPDATE INFORMATION

8.2.2.1 Update Numbers

Each update is assigned an update number which serves as a means of identifying a particular program's status. The updates are numbered sequentially starting with 1, i.e., Update 1 was the first update to AQDHS-II.

All programs in the AQDHS-II system print out an update message (see Figure 8.2-a) at the beginning of their diagnostic report. This update message includes the program's name, its revision level, the update number, and the date the update was incorporated in the EPA Baseline system. This information is necessary for troubleshooting since the update message includes the update status of the program being executed. Past problems have occured when users compiled new updates but failed to link edit them and also when users have not installed updates which corrected known problems. In both of these cases, the update message immediately reveals the problem. The user is reminded not to remove these update comments since doing so constitutes a modification to the system; EPA will not provide troubleshooting assistance for modified systems.

8.2.2.2 Update Package

If only a few changes are necessary, the update will be sent to users on cards, otherwise the update will be sent on a tape. Each installation should receive one full copy of the update (tape or cards). An abbreviated listing of the modified programs will be included in the package. This listing (see Figure 8.2-b for an example) shows all modifications to the programs, plus the first and last page of the program source code.

The update package distributed by EPA also contains an update letter (see Figure 8.2-c), an update packing list (see Figure 8.2-d), and an update verification form (see Figure 8.2-e). Additional items may be included; they will be checked on the update packing list. The update letter gives both detailed information on the modifications made in the update and instructions on installing the update. If the update is sent on tape, the letter will include a listing of the files on the tape with information on the number of records and programs contained in each file. See Figure 8.2-f for an example of a listing of a tape update. Each update letter contains a paragraph reminding users that NADB is not responsible for any modifications made to the system other than those authorized to meet a specific computer system problem.

The update packing list includes information on when the user's update was copied, the tape number (if applicable), and a checklist of items sent in the update package. If the update package does not correspond exactly with those items specified on the packing list, notify NADB for needed items.

The update packing list also includes information on the hardware and software used by the installation. This information is necessary to provide each installation with a suitable update package. If there are any errors or omissions in this information, please notify NADB.

The update verification form is to be returned to NADB once the update has been installed. The form provides NADB with information on the update status of your installation. Such information is vital when problems occur in your AQDHS-II system, and NADB is contacted for troubleshooting assistance.

Additional personnel at your installation may be on the AQDHS-II mailing list to receive letters-only copies of updates. These people will receive the update letter and any updates to the AQDHS-II documentation, but will not receive the tape or cards to install the update. A checklist for installing the update is shown in Figure 8.2-g. Details on the installation are found in Section 8.2.3 through Section 8.2.5.

8.2.3 UPDATE INSTALLATION

The following sections discuss the procedures and systems utilities used to install an update. It is recommended that updates be installed as soon as possible. If the update has been sent on a magnetic tape, the tape should be returned to NADB promptly. If there is a delay in installing the update, copy it onto your own tape and return the tape sent from NADB. NADB should be contacted for troubleshooting assistance.

8.2.3.1 IBM Utility IEBUPDTE

The IBM utility IEBUPDTE allows for the addition, deletion, replacement, and modification of modules in partitioned data sets. AQDHS-II uses partitioned data sets for both the source and the procedure libraries. The load library is also a partitioned data set, but changes are made to it by compiling and link editing modified programs. A sample listing of an IEBUPDTE deck is shown in Figure 8.2-h. This deck is provided with each AQDHS-II update. The update letter lists any changes the user should make in the update deck prior to running it at his installation.

If the update has been sent on cards, all modifications to the source library are included to be run in one execution of IEBUPDTE; procedure modifications are included to be run in a separate execution. If the update is on a tape, each program is in a separate file on that tape. Each of the files can be input to a separate run of IEBUPDTE if time and page limits are small at your installation site; if such limits are not important, all of the files can be input to one run. The control cards are coded so that each modified program will be renumbered, beginning with 100 and incrementing by 100.

A listing of each program will be produced and this listing should be compared with the listing sent in the update package to insure that all modifications were made correctly and that the program has the correct number of lines. In addition, the condition code returned by the computer upon execution of IEBUPDTE should be 0 and a message should be printed indicating that the source module was altered. See Figure 8.2-i for an example of the condition codes and Figure 8.2-j for an example of the printed message.

If you have made modifications to the source programs that cause the line numbers to be different from the baseline version, any updates which change specific lines of code (as compared to replacing the entire program) must be examined. Using the abbreviated program listing (see Figure 8.2-b) and a listing of your source program, change the line numbers in the update deck to the line numbers of the appropriate lines of code in your source program. This will insure that the update will be correctly applied to your source program. For example, if 'MAIN-LOOP.' is line 1500 of the baseline version, but is 1502 in your source, the update statement specifying line 1500 must be changed to specify line number 1502. However, if the update replaces the entire program, the replacement should be made first; any local modifications can then be made to a copy of the replacement program. Whenever local modifications are made, a copy of the baseline system must be kept. This copy will be useful in implementing future updates.

8.2.3.2 Run Stream for IEBUPDTE

The update deck contains all of the necessary JCL statements (excluding the job card) for executing IEBUPDTE. Upon receipt of the update, process the update deck through an interpreter on an interpreting keypunch. A listing of the update deck is included in the update package; the user should verify that the cards he receives are exactly as listed (see Figure 8.2-h for a sample listing).

The data set names (DSN=data set name) on the SYSUT1 and SYSUT2 DD cards must be changed to reflect the user's data set names if they are not identical. Thus, if the user's source library is 'F734.CDHS.AQS.SOURCE', the cards should be changed to the following:

```
//SYSUT1 DD DSN=F734.CDHS.AQS.SOURCE,DISP=OLD
//SYSUT2 DD DSN=F734.CDHS.AQS.SOURCE,DISP=OLD
```

If the user's source modules for the AQDHS-II programs differ in name from the baseline (e.g., if the numeric names rather than the alphanumeric names are used), those names must be changed on all control statements. Thus, if the card

```
./ REPL NAME=ARPMSTR,LIST=ALL
```

is included in the update deck and the user's version of the master file detailed report program is stored under the name AQ0230 rather than ARPMSTR, the card should be changed to

```
./ REPL NAME=AQ0230,LIST=ALL.
```

A job card must be added prior to running the IEBUPDTE run stream. If several programs are to be modified in one run, specify sufficient time and page parameters on the job card.

8.2.3.3 Non-IEBUPDTE Updates

Some IBM installations use software packages such as ADR LIBRARIAN or PANVALET that have their own methods for updating. Installations which use these packages should consult their systems personnel for information on installing the EPA-distributed updates.

Non-IBM installations have different utilities to facilitate updating. For example, UNIVAC has an @ELT processor; CDC, the MODIFY and UPDATE utilities; and Honeywell, UTILITY. The user should consult his installation's systems personnel for information on these utilities.

An update package can be tailored to a user's individual needs if he provides NADB with information about his installation's exact specifications. The update packing list notes the specifications that have been reported to NADB; the user should inform NADB of any errors or omissions in this information.

8.2.4 COMPILING UPDATED PROGRAMS

Once the IEBUPDTE procedure has been successfully performed for each program, all modified programs should be compiled and link edited. There are cataloged procedures in AQDHS-II to execute both COBOL and FORTRAN compilers and the linkage editor: the COBOL procedure is 'AQCLC10'; the FORTRAN procedure is 'AQCLF10'. The update letter will indicate which programs have to be compiled using the FORTRAN compiler. See Section 8.2.4.1 and Section 8.2.4.2 for instructions on using these procedures.

After the compile and link edit steps have been executed, the condition codes for each should be checked to insure that they are either a 4 or an 0 (see Figure 8.2-k). Also, any error messages from the compile step (see Figure 8.2-l) should be inspected. If the return code is not 4 or 0 for any job step, contact personnel at NADB and forward the listing of that job to NADB. Warning messages (W) do not cause the compile to fail, but all other messages (C, E, or D) do. The printout from the linkage editor should indicate that the load module was added to or replaced in the data set (see Figure 8.2-m).

8.2.4.1 Cataloged JCL (AQCLC10)

The cataloged procedure AQCLC10 allows IBM users to compile and link edit the COBOL programs in their source libraries. The standard IBM ANSI COBOL compiler program IKFCBL00 and linkage editor program IEWL are executed by this procedure. The actual version/level of the compiler that these programs call is installation-dependent. Information on the compiler program/level will be printed when the procedure is executed (see Figure 8.2-n).

8.2.4.1.1 JCL listing - Figure 8.2-o shows a listing of the cataloged procedure AQCLC10.

8.2.4.1.2 User-supplied JCL - To execute AQCLC10, the user must supply the names for the source and load modules of the program being compiled and link edited. See Figure 8.2-p for a description of the procedure's substitutable parameters.

8.2.4.1.3 Sample run stream - The following run stream compiles and link edits the COBOL program ARPSARD (AQ0220). The source library is CN.EPALMH.A087.CDHS.HQ.AQS.SOURCE and the load library is CN.EPALMH.A087.CDHS.HQ.AQS.LOAD.

```
// EXEC AQCLC10,
//      SOURCE=ARPSARD,
//      LOADMOD=ARPSARD
```

8.2.4.2 Cataloged JCL (AQCLF10)

The cataloged procedure AQCLF10 allows IBM users to compile and link edit the FORTRAN programs in their source libraries. The standard IBM ANSI FORTRAN compiler program IEYFORT and linkage editor program IEWL are executed by this procedure. The actual version/level of the compiler that these programs call is installation-dependent.

8.2.4.2.1 JCL listing - A listing of the cataloged procedure AQCLF10 is shown in Figure 8.2-q.

8.2.4.2.2 User-supplied JCL - To execute AQCLF10, the user must supply the names for the source and load modules of the program being compiled. See Figure 8.2-r for a description of the procedure's substitutable parameters.

8.2.4.2.3 Sample run stream - The following run stream compiles and link edits the FORTRAN program ASTMSST (AQ0200). The source library is CN.EPALMH.A087.CDHS.HQ.AQS.SOURCE and the load library is CN.EPALMH.A087.CDHS.HQ.AQS.LOAD.

```
// EXEC AQCLF10,
//      SOURCE=ASTMSST,
//      LOADMOD=ASTMSST
```

8.2.5 TESTING MODIFICATIONS

Once all modifications have been made to programs and procedures, it is recommended that tests be run to insure that the update has been successfully installed. The AQDHS-II baseline test run series contains tests of all programs and procedures. The volume of the data in the test series is much smaller than in the live data files most states maintain. Running tests with these smaller files means lower costs; also, there is no risk of destroying live files should the tests fail. The AQDHS-II master file, and the parameter, site, and parameter standards files created in the test run series could be stored on tape and used for testing updates. This procedure would allow for the testing of any desired program without requiring that the entire test run series be run to create these files. Information on the test run series can be found in the Documentation of the AQDHS-II Test Run Series.

8.2.6 COST CONSIDERATIONS

The estimate given here is for a program with 3800 statements and an update deck containing 107 cards. This update was installed using an IBM 370/168.

IEBUPDTE

CPU time: 2.1 seconds
I/O time: 20.3 seconds
Total time: 24.0 seconds

Estimated cost: $9.65

Compile and Link edit

CPU time: 22.7 seconds
I/O time: 1 minute 36.5 seconds
Total time: 1 minute 59.2 seconds

Estimated cost: $25.43

8.2.7 WARNINGS AND SPECIAL INSTRUCTIONS

Each user is reminded not to make any modifications to AQDHS-II other than those released or approved by NADB. Only the NADB baseline version of AQDHS-II will be supported by NADB. All modified versions (unless authorized to meet a specific computer system problem) must be supported by the organization which performs the modification. NADB has begun a practice of inserting comments in the programs affected by updates. These comments will allow the user to inform NADB of the update status of a particular program in case of problems. The user is urged not to remove these comments since doing so constitutes a modification to the NADB version.

If the user wants to make modifications for his own purposes, he should make them to a copy of the baseline system. He should, however, always maintain the baseline system with no changes. This will give him an opportunity to test problems against the baseline system. If there is a problem and the problem is reproduced in the baseline, the user should report the problem to NADB. If the problem occurs in the modified version only, it is the user's responsibility to correct that problem.

Once the updated programs have been tested, they may be incorporated into the production system. If the update includes modifications to file structures, programs and instructions for making the file conversions will be sent with the update package.

The update verification form (see Figure 8.2-e) should be completed and sent to NADB as soon as the update has been installed and tested. Any changes in personnel should be included on this form. Also, all NADB tapes should be returned as soon as possible.

Once the update has been completed, all people who use the system should be informed of any effect the modifications will have on their work.

If there are any problems in installing the update, contact NADB for further help.

```
                AQDHS-II PRELIMINARY STATISTICS PROGRAM  -  DIAGNOSTIC REPORT                              PAGE    1

  PROGRAM NAME: ASTPRLM (AQ0190)
  REVISION LEVEL: 1-00
  LAST UPDATE #: 24
  INCORPORATED: OCTOBER 31, 1978

  OPTION IN EFFECT: QUARTER


 NUMBER OF MASTER FILE RECORDS READ:                                   22
 NUMBER OF MASTER FILE RECORDS WITH COMPOSITE DATA:                     0
 NUMBER OF STATISTICS RAW DATA FILE RECORDS WRITTEN:                   36
 NUMBER OF PRELIMINARY STATISTICS FILE RECORDS WRITTEN:                 6
 NUMBER OF DIAGNOSTIC MESSAGES:                                         0
```

Figure 8.2-a. Sample Update Message

```
SYSIN                            NEW MASTER                                         IEBUPDTE LOG PAGE 0001

./ CHANGE NAME=ADCONVRT,LIST=ALL
./ NUMBER NEW1=100,INCR=100
               IDENTIFICATION DIVISION.                                          00000100
                 PROGRAM-ID.         AXCONVRT.                                   00000200
                 AUTHOR.             IBM CORPORATION                             00000300
                                     FEDERAL SYSTEMS DIVISION.                   00000400
                 DATE-WRITTEN.       JANUARY 13, 1978                            00000500
                                     REVISION-LEVEL 4-00.                        00000600
                 REMARKS.            AQDHS MASTER FILE TO SAROAD INPUT           00000700
              *                                                                  00000800
              *                                                                  00000900
              *  THIS IS VERSION FOUR OF THIS PROGRAM                            00001000
              *  VERSION THREE WAS COMPLETELY REPLACED BY                        00001100
              *  THIS VERSION (UPDATE 22) ON 01/13/78                            00001200
                                                                                 00001300
                                                                                 00001400
                                                                                 00001500
               ENVIRONMENT DIVISION.                                             00001600
                CONFIGURATION SECTION.                                           00001700
                 SOURCE-COMPUTER.    IBM-360.                                    00001800
                 OBJECT-COMPUTER.    IBM-360.                                    00001900
                 SPECIAL-NAMES.      C01 IS TO-NEW-PAGE.                         00002000
                                                                                 00002100
                                                                                 00002200
                INPUT-OUTPUT SECTION.                                            00002300
                 FILE-CONTROL.                                                   00002400
                   SELECT AQDHS-FILE                                             00002500
                       ASSIGN TO UR-S-AQSMASTR.                                  00002600
                   SELECT NEW-AQDHS-FILE                                         00002700
                       ASSIGN TO UR-S-AQSNEWMS.                                  00002800
                   SELECT SAROAD-ADD-FILE                                        00002900
                       ASSIGN TO UR-S-AQSADDFL.                                  00003000
                   SELECT SAROAD-CHANGE-FILE                                     00003100
                       ASSIGN TO UR-S-AQSCHGFL.                                  00003200
                   SELECT PRINT-FILE                                             00003300
                       ASSIGN TO UR-S-AQSPRINT.                                  00003400
                                                                                 00003500
                                                                                 00003600
                                                                                 00003700
               DATA DIVISION.                                                    00003800
                FILE SECTION.                                                    00003900
                 FD  AQDHS-FILE                                                  00004000
                       BLOCK CONTAINS 8 RECORDS                                  00004100
                       LABEL RECORD IS OMITTED.                                  00004200
                                                                                 00004300
                                                                                 00004400
                 01  MASTER-RECORD.                                              00004500
                   02  ACTION-CODE  PIC X.                                       00004600
                   02  FORM-CODE    PIC X.                                       00004700
                     02  IDENT-KEY.                                              00004800
                         03  KEY-1.                                              00004900
                             04  STATE                 PIC XX.                   00005000
```

(page 1 of 2)

Figure 8.2-b. IEBUPDTE Output - Program Listing

```
SYSIN                            NEW MASTER                                        IEBUPDTE LOG PAGE 0013

                      MOVE 12 TO SAROAD-1-START-HOUR                            00062300
                                                      ELSE                      00062400
                      ADD BINARY-1 TO TRANS-SUB.                                00062500
                 EXTRACT-DATA-1-END.                                            00062600
                   EXIT.                                                        00062700
                                                                                00062800
                                                                                00062900
                                                                                00063000
                 EXTRACT-DATA-2.                                                00063100
                   IF STATUS-IS-SENT (MSTR-SUB)                                 00063200
                     NEXT SENTENCE                                              00063300
                   ELSE                                                         00063400
                    IF STATUS-IS-ADD (MSTR-SUB) AND                             00063500
                       DATA-FIELD (MSTR-SUB) NOT = NULL-RDNG AND                00063600
                       DATA-FIELD (MSTR-SUB) NOT = SPACES OR                    00063700
                            STATUS-IS-CHANGE (MSTR-SUB)                         00063800
                      PERFORM MOVE-FORM-2 THRU MOVE-FORM-2-END                  00063900
              *          TO SAROAD-2-READING (TRANS-SUB)                        00064000
                     PERFORM INCREMENT-BY-TIME-CODE                             00064100
                         THRU INCREMENT-BY-TIME-CODE-END                        00064200
                     MOVE SAROAD-TRANS-2 TO SAROAD-TRANSACTION                  00064300
                     MOVE FORM-2 TO SAROAD-TRANS-CODE                           00064400
                     IF STATUS-IS-ADD (MSTR-SUB)                                00064500
                       MOVE TRUE TO TYPE-IS-ADD-SW                              00064600
                       PERFORM WRITE-ROUTINE THRU WRITE-ROUTINE-END             00064700
                       MOVE SENT-CODE TO STATUS-FLAG (MSTR-SUB)                 00064800
                     ELSE                                                       00064900
                       MOVE FALSE TO TYPE-IS-ADD-SW                             00065000
                       MOVE SENT-CODE TO STATUS-FLAG (MSTR-SUB)                 00065100     *          INSERTED*
                       PERFORM WRITE-ROUTINE THRU WRITE-ROUTINE-END             00065200
                    ELSE                                                        00065300
                         ADD BINARY-1 TO NULL-ADD-COUNT                         00065400
                       MOVE SENT-CODE TO STATUS-FLAG (MSTR-SUB).                00065500
                 EXTRACT-DATA-2-END.                                            00065600
                   EXIT.                                                        00065700
                                                                                00065800
                                                                                00065900
                                                                                00066000
                 INCREMENT-BY-TIME-CODE.                                        00066100
                     IF DAILY                                                   00066200
                       MOVE MSTR-SUB TO SAROAD-2-DAY-R                          00066300
                     ELSE                                                       00066400
                       IF WEEKLY                                                00066500
                         COMPUTE                                                00066600
                             WK-DAY = ((MSTR-SUB - BINARY-1) * BINARY-7)        00066700
                                     + BINARY-1                                 00066800
                         MOVE WK-DAY TO SAROAD-2-DAY-R                          00066900
                       ELSE                                                     00067000
                         IF MONTHLY                                             00067100
                            MOVE MSTR-SUB TO SAROAD-2-MONTH-R                   00067200
                         ELSE                                                   00067300
                           IF QUARTERLY                                         00067400
```

(page 2 of 2)

Figure 8.2-b - continued. IEBUPDTE Output - Program Listing

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: SEP 30 1977

SUBJECT: AQDHS-II UPDATE 20

FROM: Lloyd Hedgepeth, Environmental Engineer
Systems Development Section, NADB (MD-14) LMH

TO: AQDHS-II USERS

Enclosed is the package for Update 20 to the AQDHS-II system. The Update Tracking Form shows what your package contains. If the hardware or software information on the form is not correct for your installation, please notify me. This information will be used to provide you with an update package most suited to the needs of your installation.

This update was basically required in order to incorporate the negative meteorological data handling capability. However, there were a number of additional improvements made and several reported problem solutions are incorporated in this update. These are discussed in Attachment 1.

As many non-OS users have requested update tapes with each program in a separate file, and with no control cards, we have provided such a tape for those installations. Please note that on that tape, files 1 and 2, containing multiple programs, do contain control cards separating the COBOL copy members.

The actual contents of your tape will be shown on the tape contents sheet and in the listing printed from your tape.

An update deck is provided for those who use the standard IBM-OS utilities. In almost every installation, your data set name (DSNAME) will not be the same as that on the //SYSUT1 and //SYSUT2 cards required for the IEBUPDTE utility. Be sure to change the DSNAME to your data set name on those cards in each step of the update. If the member name on the control card image which is contained on the enclosed tape (./ REPL NAME=XXXXXXXX, LIST=ALL) is not correct for your installation, this will have to be changed.

For those users not having IBM equipment, you can use your own update utility.

We have enclosed a revised trouble shooting form. We hope this one page form will be easier to use. Please use it when reporting any problems.

The baseline test series has been expanded to 53 test jobs. We feel that they better exercise the system. A copy of the test series may be obtained by returning the enclosed test series request form and a tape to which they can be copied.

Figure 8.2-c. Update Letter (page 1 of 5)

Each user is reminded *not* *to make program modifications to AQDHS-II other than those released or approved by NADB. Only the NADB version of AQDHS-II will be supported by NADB. All modified versions (unless authorized to meet a specific computer system problem) must be supported by the organization which performs the modification. NADB has begun a practice of inserting comments in the programs affected by updates. These comments will allow the user to inform NADB of the update status of a particular program in case of problems. The user is urged not to remove these comments as they will be modifications to the NADB version.*

If you wish to make modifications for your own purposes, you should make them to a copy of the baseline system. You should, however, maintain the baseline system with no changes. This will give you an opportunity to test problems against the baseline. If you have a problem and the problem is reproduced in the baseline, please report the problem to NADB. If the problem occurs in the modified version only, it is the user's responsibility to correct that problem.

Please fill out the enclosed Update Verification Form and return it to me. Return the tape to NADB as soon as possible.

If you need further assistance or additional information, please contact Mr. Lloyd Hedgepeth at (919) 541-5491, or Mr. Larry McMaster at (919) 541-6821.

Enclosures

Figure 8.2-c - continued. Update Letter (page 2 of 5)

ATTACHMENT 1

Problems Resolved and Improvements Incorporated in
Update 20 to AQDHS-II

A. General Problems

1. The update messages have been incorporated into all programs affected by this update.

2. All the programs were compiled and run on the UNIVAC 1110 and all general errors resulting from Update 18 have been resolved. These errors were tolerated by an IBM compiler but caused severe problems for a UNIVAC compiler. The UNIVAC related problems were:

   a) "01" appearing in the B margin

   b) Logical "IF" statements were too complex for the UNIVAC compiler to handle

   c) Empty paragraphs

   d) Invalid sentence continuation

   e) Failure to close all files

   f) Mixed mode moves (i.e., alphameric to numeric, etc.)

   g) Use of "FILLER" at the group level

   h) Use of recursive subroutine calls.

B. Specific Program Problems

1. AXCONVRT - Modified the summary statistics to delete the count for the number of SAROAD ADD transactions with all null readings.

2. CXCONVRT

   a) Incorporated a "LIST" option of valid transactions (default is "NOLIST").

   b) Standardized the error messages.

   c) Included the number of action cards ("$" cards) in the summary statistics.

(page 3 of 5)

Figure 8.2-c - continued. Update Letter

3. DXSTATIS

   a) Standardized the error messages.

   b) Provided summary statistics.

   c) Since the negative data mods altered the internal file format in a manner which is not compatible with FORTRAN, the sentinel programs (MXSENTNL and NXSENTNL) must now be run prior to execution of DXSTATIS to reformat the file to be FORTRAN compatible. Otherwise DXSTATIS will abort the run.

4. EXRPTLST

   a) Expanded the print line to 132 characters since there was no negative response to this modification as discussed in Volume I, No. 6 of the Users Bulletin.

   b) Incorporated the minimum detectable value in the report header.

   c) Corrected the method used to obtain the maximum raw data value.

   d) Modified the mean value calculations routine to provide round off instead of truncation. Printed values from the COBOL and FORTRAN programs should now match exactly.

5. FXFILMNT

   a) Expanded the summary statistics to indicate the number of readings flagged for deletion.

   b) Provided a negative value table for the "LIST" option since the list option shows the data field with the negative sign as an overpunched character. This table allows the user to readily interpret the data value.

   c) Corrected the technique used in processing composite data.

6. IXSLDAVG - Corrected a subscripting problem which resulted from Update 18.

7. PXSITE

   a) Added title line.

   b) Decreased number of lines per page.

8. SXPRINTS

   a) Prints two sites per page to save paper.

(page 4 of 5)

Figure 8.2-c - continued. Update Letter

b) Prints the minimum detectable value and the number of times it was substituted.

9. TXTREDIT

a) Performs an edit check on the data for all parameters for which SAROAD has a maximum value check. The values which exceed the maximum value check are now accepted by AQDHS-II and a non-suppressible warning message is printed.

b) Corrected several error messages.

c) Added additional edit checks for negative data.

d) Any Form 2 or 3 repeating data which is in error will not appear on the list of valid transactions (using the LIST option). However, the data in error is listed in the diagnostic listing with its appropriate error messages.

e) Edit checks for the entire matrix of SAROAD start hour versus sampling interval have been included.

10. RTRETRVR - Corrected the wrap-around feature for the sliding average mode from Update 18.

C. Additional Procedures

1. A procedure AQSRETCL was added to allow the user to compile, link edit, and save standard retrievals in the LOAD library. This saves the user the expense of recompiling and linking his standard retrievals each time they are needed.

2. Procedure AQSRETGO was added to allow for execution of retrievals stored in the LOAD library.

Figure 8.2-c - continued. Update Letter (page 5 of 5)

UPDATE PACKING LIST

Update #:______________________________ Date:__________________

Name: Tape #:________________

Date Copied:__________________________ Date Listed:____________

Date Mailed to User:___________________ Date Returned:__________

Update #:_______ Returned: YES_____ NO_____

Type of Hardware:______________________

Software Configuration:

Special Instructions:

Tape Enclosed:________________ Tape or Update Listing:________

Tape Contents:________________ Problem Reporting Form:________

Update Deck:__________________ Update Deck Listing:__________

Update Verification Form:_______ Update Packing List:__________

Documentation:________________ Update Cover Letter:__________

Verified by:____

Figure 8.2-d. Update Packing List

UPDATE VERIFICATION FORM

Return to EPA

Update No. ____________ **Subsystem** ***(check one)*****:** ________ **AQDHS-II** ________ **EIS/P&R**

Date update performed: ______________________________

Date affected programs recompiled: ______________________________

Date affected programs link-edited: ______________________________

PERSONNEL CHANGES

(For personnel on EPA mailing lists for update decks and letter, update letter only, Newsletter)

New employee ***(name)*****:** ______________________________

Assigned to ***(check as appropriate)*****:** ________ **AQDHS-II** ________ **EIS/P&R**

Replaces ***(name)*****:** ______________________________

To receive ***(check as appropriate)*****:** ________ **Update decks and letter**

________ **Update letters w/o decks** ________ **Newsletter**

New employee ***(name)*****:** ______________________________

Assigned to ***(check as appropriate)*****:** ________ **AQDHS-II** ________ **EIS/P&R**

Replaces ***(name)*** **:** ______________________________

To receive ***(check as appropriate)*****:** ________ **Updates decks and letter**

________ **Update letters w/o decks** ________ **Newsletter**

(For additional listings, please use blank sheet.)

______________________________ ______________________________

(Signature) ***(Date)***

Figure 8.2-e. Update Verification Form

CONTENTS OF UPDATE 20 TAPE - NO CONTROL CARDS

FILE #	PROGRAMS	# OF RECORDS	UPDATE FILE
1	Copy Members - RTRETRVR, RPREPEAT, RPSKCOMP, RPSLRCTL, RPSTDCTL, RPWRITCL, RPWRITES, GDMAXRDG, RDANSRCB, RDCNTLSW, RPUSERRT, RPWRAPIT, RPWRAPUP, RPWRITWK, RDERRMSG, RDSLCTLS, RDSLERMS, RDUSER01, RDWKMSTR, RPBLDNUL, RPDELTPD, RPGENREC, RPGMINIT, RPGMINTL, RPMAINRT, RPMAINSD, RPMVMSTR, RPQLINIT	1433	SOURCE
2	AQSRTRCL, AQSRTRGO, AQSCNVRT	253	JCL
3	ADCONVRT	877	SOURCE
4	ADMERGE	391	SOURCE
5	CDCONVRT	1025	SOURCE
6	DDSTATIS	986	SOURCE
7	EDRPTLST	4082	SOURCE
8	FDFILMNT	2868	SOURCE
9	HDTABLE1	787	SOURCE
10	IDSLDAVG	1442	SOURCE
11	LDLNGPRC	2463	SOURCE
12	MDSENTNL	453	SOURCE
13	NDSENTNL	436	SOURCE
14	PDSITE	239	SOURCE
15	SDPRINTS	2006	SOURCE
16	TDTREDIT	3162	SOURCE

Figure 8.2-f. Tape Contents

_____ Verify that package contents are correct

_____ Copy tape update onto private tape (tape update only)

_____ Return NADB tape (tape update only)

_____ Install documentation updates, if any

_____ Interpret update deck

_____ Run update utility to modify source programs

_____ Verify program updates

_____ Compile and link edit all modified programs

_____ Verify that all compiles and link edits are correct

_____ Run update utility to modify cataloged procedures (if applicable)

_____ Verify procedure updates (if applicable)

_____ Test modified programs and procedures
(move procedures to system library)

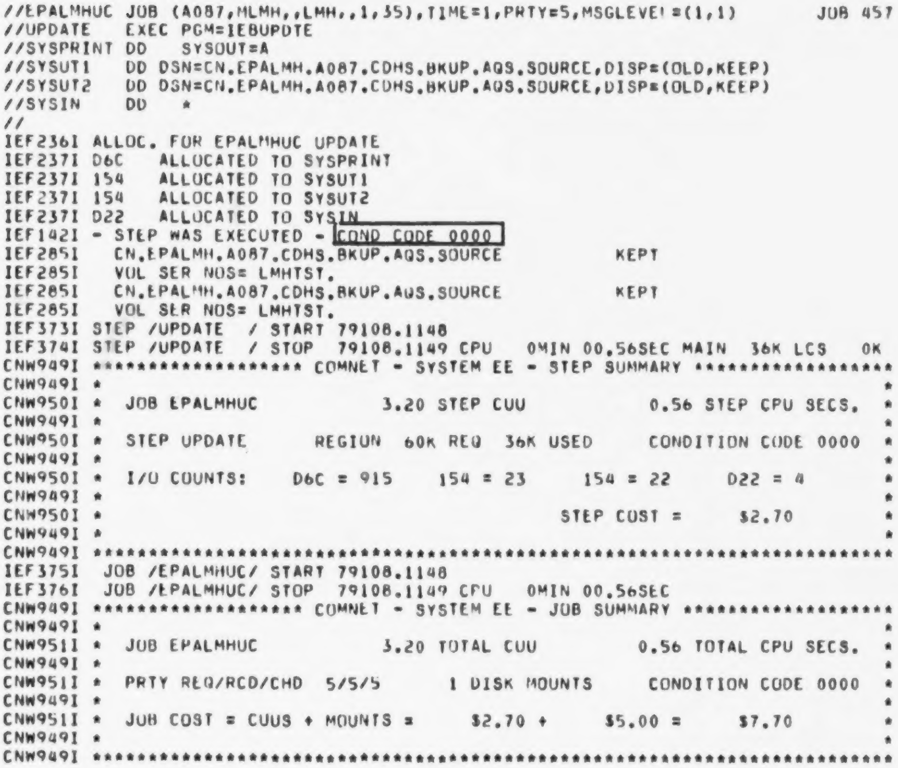
_____ Return completed update verification form

_____ Backup complete system

Figure 8.2-g. Checklist for Installing Update

```
//     EXEC    PGM=IEBUPDTE
//SYSUT1  DD  DSN=CN.EPALMH.A087.CDHS.HQ.AQS.SOURCE,DISP=OLD
//SYSUT2  DD  DSN=CN.EPALMH.A087.CDHS.HQ.AQS.SOURCE,DISP=OLD
//SYSPRINT  DD  SYSOUT=A
//SYSIN  DD  *
./ CHANGE NAME=DDSTATIS,LIST=ALL
./ NUMBER NEW1=100,INCR=100
C     *      DATE-WRITTEN: MARCH 8, 1978
C     *                      REVISION LEVEL 2-01.                         *00001400
C     *      UPDATE 23 INSTALLED 3/8/78.                                  *00001600
         DATA          MDDATA       / 11000 /                             *00002210
 9001 FORMAT (' ',' REVISION LEVEL: 2-01')                                 00030300
 9002 FORMAT (' ',' LAST UPDATE: 2-01')                                    00038000
 9003 FORMAT (' ',' INCORPORATED: MARCH 8, 1978')                          00038100
            IF (MRDECP .NE. MBDECP) LNEWSM = .TRUE.                        00038200
./ DELETE SEQ1=72100,SEQ2=72100                                            00071410
  548       IF (.NOT.((I .LE. NNNMAX) .AND. (J .LE. MDPERC))) GO TO 549
  550          IF (.NOT. ((XRATIO .GT. XPCENT) .AND. (J .LE. MDPERC)))     00079300
               IF ((XRATIO .NE. XPCMAX).AND. (J .LE. MDPERC))              00079600
        IF (J .GT. 10) GO TO 9957                                          00081000
 9957  CONTINUE                                                            00082110
./ CHANGE NAME=TDTREDIT,LIST=ALL                                           00082510
./ NUMBER NEW1=100,INCR=100
                              REVISION LEVEL 3-02.
     *  UPDATE 23 INCORPORATED ON 02/01/78                                 00000600
                   03  FILLER                                              00001510
                   03  FILLER                PIC X(104) VALUE '3-02'.      00060300
                   03  FILLER                PIC X(105) VALUE '23'.        00060600
                               PIC X(106) VALUE 'FEBRUARY 1, 1978'.        00060900
                                         VALUE '43101010098100'.           00121700
                                         VALUE '43101020107096'.           00121900
                                         VALUE '43101050000098'.           00122100
                                         VALUE '43101060000107'.           00122300
                                         VALUE '43101070000150'.           00122500
                                         VALUE '43101080150000'.           00122700
                                         VALUE '43102010065400'.           00122900
                                         VALUE '43102020071398'.           00123100
                                         VALUE '43102050000066'.           00123300
                                         VALUE '43102070000100'.           00123500
                                         VALUE '43102080100000'.           00123700
```

Figure 8.2-h. Listing of Update Deck



```
//EPALMHUC JOB (A087,MLMH,,LMH,,1,35),TIME=1,PRTY=5,MSGLEVE!=(1,1)       JOB 457
//UPDATE   EXEC PGM=IEBUPDTE
//SYSPRINT DD   SYSOUT=A
//SYSUT1   DD DSN=CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE,DISP=(OLD,KEEP)
//SYSUT2   DD DSN=CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE,DISP=(OLD,KEEP)
//SYSIN    DD   *
//
IEF236I ALLOC. FOR EPALMHUC UPDATE
IEF237I D6C   ALLOCATED TO SYSPRINT
IEF237I 154   ALLOCATED TO SYSUT1
IEF237I 154   ALLOCATED TO SYSUT2
IEF237I D22   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE          KEPT
IEF285I   VOL SER NOS= LMHTST.
IEF285I   CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE          KEPT
IEF285I   VOL SER NOS= LMHTST.
IEF373I STEP /UPDATE  / START 79108.1148
IEF374I STEP /UPDATE  / STOP  79108.1149 CPU   0MIN 00.56SEC MAIN  36K LCS   0K
CNW949I ******************* COMNET - SYSTEM EE - STEP SUMMARY ******************
CNW949I *                                                                      *
CNW950I *  JOB EPALMHUC           3.20 STEP CUU          0.56 STEP CPU SECS.   *
CNW949I *                                                                      *
CNW950I *  STEP UPDATE      REGION  60K REQ  36K USED     CONDITION CODE 0000  *
CNW949I *                                                                      *
CNW950I *  I/O COUNTS:    D6C = 915    154 = 23     154 = 22     D22 = 4       *
CNW949I *                                                                      *
CNW950I *                                        STEP COST =     $2.70         *
CNW949I *                                                                      *
CNW949I ************************************************************************
IEF375I  JOB /EPALMHUC/ START 79108.1148
IEF376I  JOB /EPALMHUC/ STOP  79108.1149 CPU   0MIN 00.56SEC
CNW949I ******************* COMNET - SYSTEM EE - JOB SUMMARY *******************
CNW949I *                                                                      *
CNW951I *  JOB EPALMHUC           3.20 TOTAL CUU         0.56 TOTAL CPU SECS.   *
CNW949I *                                                                      *
CNW951I *  PRTY REQ/RCD/CHD  5/5/5      1 DISK MOUNTS     CONDITION CODE 0000  *
CNW949I *                                                                      *
CNW951I *  JOB COST = CUUS + MOUNTS =     $2.70 +     $5.00 =     $7.70         *
CNW949I *                                                                      *
CNW949I ************************************************************************
```

Figure 8.2-i. Condition Codes for IEBUPDTE

```
      SYSIN                           NEW MASTER                                IEBUPDTE LOG PAGE 0018

                                     AFTER ADVANCING LINE-SKIP LINES             00088300
                                 ADD LINE-SKIP TO LINE-CTR.                      00088400
                             PRINT-HEADER-END.                                   00088500
                               EXIT.                                             00088600
                                                                                 00088700
                                                                                 00088800
                                                                                 00088900
                                                                                 00089000
                                                                                 00089100
                                                                                 00089200
IEB816I MEMBER NAME (ADCONVRT) FOUND IN NM DIRECTORY. TTR IS NOW ALTERED.
IEB818I HIGHEST CONDITION CODE WAS 00000000
IEB819I END OF JOB IEBUPDTE.
```

Figure 8.2-j. Message Indicating Completion of IEBUPDTE Modification

```
//EPALMH6W JOB (A087,MLMH,,LMH,,1,35),TIME=3,PRTY=5,MSGLEVEL=(1,1)           JOB 535
***ROUTE PRINT RMT63
// EXEC COBVCL,CPARM='SXREF,VERB,DMAP,STATE,FLOW=10',SIZE1=8192,
// SIZE2=8192
XXCOBVCL PROC PRINT=A,PUNCH=B,DECK=DUMM,CPARM=,CREGION=140K,VER=4,          00003100
XX      LREGION=100K,LPARM='LET,LIST,XREF',SIZE1=,SIZE2=                    00003200
***  PROC COBVCL - COBOL VERSIONS 3 & 4 COMPILE AND LINK-EDIT    8-1-74 00003300
XXCOB EXEC PGM=IKFCBL00,REGION=&CREGION,PARM='SOURCE,NOZWB,DECK,&CPARM' 00003400
IEF653I SUBSTITUTION JCL - PGM=IKFCBL00,REGION=140K,PARM='SOURCE,NOZWB,DECK,SXREF,VERB,DMAP,STATE,FLOW=10'
XXSTEPLIB  DD  DSN=SYS2.COB&VER.LINK,DISP=SHR                                00003500
IEF653I SUBSTITUTION JCL - DSN=SYS2.COB4LINK,DISP=SHR
XXSYSLIN        DD      UNIT=SYSDA,DSN=&OBJMOD,DISP=(MOD,PASS),              00003600
XX          SPACE=(3120,(20,20)),DCB=(RECFM=FB,BLKSIZE=3120,LRECL=80)      00003700
XXSYSPRINT DD SYSOUT=&PRINT,DCB=(RECFM=FBA,BLKSIZE=3146,LRECL=121)        00003800
IEF653I SUBSTITUTION JCL - SYSOUT=A,DCB=(RECFM=FBA,BLKSIZE=3146,LRECL=121)
XXSYSPUNCH DD &DECK=&PUNCH,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)           00003900
IEF653I SUBSTITUTION JCL - DUMM=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
XXSYSUT1 DD DSN=&SYSUT1,UNIT=SYSDA,SPACE=(3120,(80,80))                   00004000
XXSYSUT2 DD DSN=&SYSUT2,UNIT=SYSDA,SPACE=(3120,(80,80))                   00004100
XXSYSUT3 DD DSN=&SYSUT3,UNIT=SYSDA,SPACE=(3120,(80,80))                   00004200
XXSYSUT4 DD DSN=&SYSUT4,UNIT=SYSDA,SPACE=(3120,(80,80))                   00004300
//COB.SYSLIB DD DSN=CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE,DISP=OLD
//COB.SYSIN DD DSN=CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE(ADCONVRT),
// DISP=OLD
IEF236I ALLOC. FOR EPALMH6W COB
IEF237I 1C5    ALLOCATED TO STEPLIB
IEF237I 2F0    ALLOCATED TO SYSLIN
IEF237I D58    ALLOCATED TO SYSPRINT
IEF237I 321    ALLOCATED TO SYSUT1
IEF237I 330    ALLOCATED TO SYSUT2
IEF237I 1C0    ALLOCATED TO SYSUT3
IEF237I 2F1    ALLOCATED TO SYSUT4
IEF237I 154    ALLOCATED TO SYSLIB
IEF237I 154    ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS2.COB4LINK                                  KEPT
IEF285I   VOL SER NOS= APPL01.
IEF285I   SYS79108.T055137.RV000.EPALMH6W.OBJMOD         PASSED
IEF285I   VOL SER NOS= WORK51.
IEF285I   DED79108.T055110.RV013.INIT.R0132984           KEPT
IEF285I   VOL SER NOS= WORK50.
IEF285I   DED79108.T055110.RV013.INIT.R0232984           KEPT
IEF285I   VOL SER NOS= WORK56.
IEF285I   DED79108.T055110.RV013.INIT.R0332984           KEPT
IEF285I   VOL SER NOS= WORK52.
IEF285I   DED79108.T055110.RV013.INIT.R0432984           KEPT
IEF285I   VOL SER NOS= WORK55.
IEF285I   CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE            KEPT
IEF285I   VOL SER NOS= LMHTST.
IEF285I   CN.EPALMH.A087.CDHS.BKUP.AQS.SOURCE            KEPT
IEF285I   VOL SER NOS= LMHTST.
IEF373I STEP /COB     / START 79108.1202
IEF374I STEP /COB     / STOP  79108.1210 CPU   0MIN 03.96SEC MAIN 138K LCS   0K
CNW949I ******************** COMNET - SYSTEM EE - STEP SUMMARY ******************
CNW949I *                                                                       *
CNW950I *  JOB EPALMH6W          17.60 STEP CUU            3.96 STEP CPU SECS.  *
CNW949I *                                                                       *
CNW950I *  STEP COB          REGION 140K REQ 138K USED     CONDITION CODE 0000  *
CNW949I *                                                                       *
CNW950I *  I/O COUNTS:     1C5 = 0       2F0 = 8      D58 = 1638   321 = 47     *
CNW950I *    330 = 37      1C0 = 44      2F1 = 95     154 = 0      154 = 23     *
```

(page 1 of 2)

Figure 8.2-k. Condition Codes for Compiler and Linkage Editor

```
CNW949I *                                                                            *
CNW950I *                                                                            *
CNW949I *                                              STEP COST =    $14.78         *
CNW949I ******************************************************************************
XXLKED EXEC PGM=IEWL,PARM='&LPARM,SIZE=(&SIZE1,&SIZE2)',                         00004400
IEF653I SUBSTITUTION JCL - PGM=IEWL,PARM='LET,LIST,XREF,SIZE=(8192,8192)',
XX     REGION=&LREGION,COND=(4,LT,COB)                                           00004500
IEF653I SUBSTITUTION JCL - REGION=100K,COND=(4,LT,COB)
XXSYSLIB DD DSN=SYS2.COB&VER.LIB,DISP=SHR                                        00004600
IEF653I SUBSTITUTION JCL - DSN=SYS2.COB4LIB,DISP=SHR
XX         DD DSN=SYS3.COMNET.SYSLIB,DISP=SHR                                    00004700
XX         DD DSN=SYS1.FORTLIB,DISP=SHR                                          00004800
XXSYSLIN DD DSN=&OBJMOD,DISP=(OLD,DELETE)                                        00004900
XX      DD DDNAME=SYSIN                                                          00005000
//LKED.SYSLMOD DD DSN=CN.EPALMH.A087.CDHS.BKUP.AQS.LOAD(AXCONVRT),
// DISP=OLD
X/SYSLMOD DD DSN=&LODMOD(MAIN),UNIT=SYSDA,DISP=(,PASS),                          00005100
XX    SPACE=(CYL,(2,2,1))                                                        00005200
XXSYSPRINT DD SYSOUT=&PRINT,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=3146)               00005300
IEF653I SUBSTITUTION JCL - SYSOUT=A,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=3146)
XXSYSUT1 DD DSN=&SYSUT1,UNIT=SYSDA,SPACE=(3120,(80,80))                          00005400
//
IEF236I ALLOC. FOR EPALMH6W LKED
IEF237I 1C5    ALLOCATED TO SYSLIB
IEF237I 338    ALLOCATED TO
IEF237I 338    ALLOCATED TO
IEF237I 2F0    ALLOCATED TO SYSLIN
IEF237I 154    ALLOCATED TO SYSLMOD
IEF237I D52    ALLOCATED TO SYSPRINT
IEF237I 321    ALLOCATED TO SYSUT1
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I    SYS2.COB4LIB
IEF285I    VOL SER NOS= APPL01.                               KEPT
IEF285I    SYS3.COMNET.SYSLIB
IEF285I    VOL SER NOS= OS218B.                               KEPT
IEF285I    SYS1.FORTLIB
IEF285I    VOL SER NOS= OS218B.                               KEPT
IEF285I    SYS79108.T055137.RV000.EPALMH6W.OBJMOD             DELETED
IEF285I    VOL SER NOS= WORK51.
IEF285I    CN.EPALMH.A087.CDHS.BKUP.AQS.LOAD                  KEPT
IEF285I    VOL SER NOS= LMHTST.
IEF285I    DED79108.T055110.RV013.INIT.R0132984               KEPT
IEF285I    VOL SER NOS= WORK50.
IEF373I STEP /LKED     / START 79108.1210
IEF374I STEP /LKED     / STOP  79108.1211 CPU    0MIN 00.37SEC MAIN  96K LCS   0K
CNW949I ******************** COMNET - SYSTEM EE - STEP SUMMARY ******************
CNW949I *                                                                          *
CNW950I *  JOB EPALMH6W             7.70 STEP CUU           0.37 STEP CPU SECS.    *
CNW949I *                                                                          *
CNW950I *  STEP LKED          REGION 100K REQ  96K USED     CONDITION CODE 0000    *
CNW949I *                                                                          *
CNW950I *  I/O COUNTS:     1C5 = 93     338 = 0      338 = 0       2F0 = 9         *
CNW950I *    154 = 22      D52 = 57     321 = 152                                  *
CNW949I *                                                                          *
CNW950I *                                                                          *
CNW949I *                                           STEP COST =     $6.48          *
CNW949I ****************************************************************************
IEF375I  JOB /EPALMH6W/ START 79108.1202
IEF376I  JOB /EPALMH6W/ STOP  79108.1211 CPU   0MIN 04.33SEC
CNW949I ******************** COMNET - SYSTEM EE - JOB SUMMARY *******************
CNW949I *                                                                          *
```

Figure 8.2-k - continued. Condition Codes for Compiler and Linkage Editor (page 2 of 2)

```
25

CARD  ERROR MESSAGE

295   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
296   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
332   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
349   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
353   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
364   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
365   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
367   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
369   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
373   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
398   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
401   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
419   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
426   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
427   IKF5011I-W     AN INTERMEDIATE RESULT OR A SENDING FIELD MIGHT HAVE ITS HIGH ORDER DIGIT POSITION
                     TRUNCATED.
```

Figure 8.2-1. Error Messages from Compiler

```
 LOCATION  REFERS TO SYMBOL  IN CONTROL SECTION          LOCATION  REFERS TO SYMBOL  IN CONTROL SECTION

ENTRY ADDRESS       00
TOTAL LENGTH      5CF0

****AXCONVRT  NOW REPLACED IN DATA SET
```

Figure 8.2-m. Linkage Editor Message

```
PP 5734-CB2 V4 RELEASE 1.4 01AUG76       IBM US AMERICAN NATIONAL STANDARD COBOL                        DATE APR 18,1979

   1

00001          IDENTIFICATION DIVISION.                                                  00000100
00002            PROGRAM-ID.          AXCONVRT.                                          00000200
00003            AUTHOR.              IBM CORPORATION                                    00000300
00004                                 FEDERAL SYSTEMS DIVISION.                          00000400
00005            DATE-WRITTEN.        JANUARY 13, 1978                                   00000500
00006                                 REVISION-LEVEL 4-00.                               00000600
00007            REMARKS.             AQDHS MASTER FILE TO SAROAD INPUT                  00000700
00008         *                                                                          00000800
00009         *                                                                          00000900
00010         *  THIS IS VERSION FOUR OF THIS PROGRAM                                    00001000
00011         *  VERSION THREE WAS COMPLETELY REPLACED BY                                00001100
00012         *  THIS VERSION (UPDATE 22) ON 01/13/78                                    00001200
00013                                                                                    00001300
00014                                                                                    00001400
00015                                                                                    00001500
00016          ENVIRONMENT DIVISION.                                                     00001600
00017           CONFIGURATION SECTION.                                                   00001700
00018            SOURCE-COMPUTER.    IBM-360.                                            00001800
00019            OBJECT-COMPUTER.    IBM-360.                                            00001900
00020            SPECIAL-NAMES.      C01 IS TO-NEW-PAGE.                                 00002000
00021                                                                                    00002100
00022                                                                                    00002200
00023           INPUT-OUTPUT SECTION.                                                    00002300
00024            FILE-CONTROL.                                                           00002400
00025              SELECT AQDHS-FILE                                                     00002500
00026                  ASSIGN TO UR-S-AQSMASTR.                                          00002600
00027              SELECT NEW-AQDHS-FILE                                                 00002700
00028                  ASSIGN TO UR-S-AQSNEWMS.                                          00002800
00029              SELECT SAROAD-ADD-FILE                                                00002900
00030                  ASSIGN TO UR-S-AQSADDFL.                                          00003000
00031              SELECT SAROAD-CHANGE-FILE                                             00003100
00032                  ASSIGN TO UR-S-AQSCHGFL.                                          00003200
00033              SELECT PRINT-FILE                                                     00003300
00034                  ASSIGN TO UR-S-AQSPRINT.                                          00003400
00035                                                                                    00003500
00036                                                                                    00003600
00037                                                                                    00003700
00038          DATA DIVISION.                                                            00003800
00039           FILE SECTION.                                                            00003900
00040            FD  AQDHS-FILE                                                          00004000
00041                  BLOCK CONTAINS 8 RECORDS                                          00004100
00042                  LABEL RECORD IS OMITTED.                                          00004200
00043                                                                                    00004300
00044                                                                                    00004400
00045            01  MASTER-RECORD.                                                      00004500
00046              02  ACTION-CODE  PIC X.                                               00004600
00047              02  FORM-CODE    PIC X.                                               00004700
00048                02  IDENT-KEY.                                                      00004800
00049                    03  KEY-1.                                                      00004900
00050                        04  STATE            PIC XX.                                00005000
00051                        04  AREA-CODE        PIC 9(4).                              00005100
00052                        04  SITE             PIC 999.                               00005200
00053                        04  AGENCY           PIC A.                                 00005300
00054                        04  PROJECT          PIC 99.                                00005400
```

Figure 8.2-n. Compiler Version Message

```
//*
//*    PROCEDURE NAME: AQCLC10
//*    REVISION LEVEL: 1-00
//*    LAST UPDATE #: 24
//*    DATE INCORPORATED: OCTOBER 31, 1978
//*
//*
//*    THIS PROCEDURE ALLOWS THE USER TO COMPILE AND LINK-EDIT COBOL
//*    PROGRAMS
//*
//*
//AQCLC10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PARAM='DMAP,SXREF,LIB,SIZE=114K,BUF=30K,STATE,FLOW=10',
//             PRIMARY=50,
//             SPCUNIT=TRK,
//             SECNDRY=100,
//             M2=NULL,
//             M3=NULL,
//             M4=NULL,
//             M5=NULL,
//             M6=NULL,
//             M7=NULL,
//             M8=NULL,
//             SOURCE=NULL,
//             LOADMOD=NULL,
//             PRIM1=60,
//             PRIM2=60,
//             TEMP=SYSDA
//*
//COBOL   EXEC PGM=IKFCBL00,
//             REGION=130K,
//             PARM='&PARAM'
//*
//* FXECUTE COBOL COMPILER
//*
//SYSLIB     DD DSNAME=&PROJECT..SOURCE,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - SOURCE MODULE
//*
//SYSIN      DD DSNAME=&PROJECT..SOURCE(&SOURCE),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M2),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M3),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M4),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M5),
```

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Figure 8.2-o. Cataloged Procedure AQCLC10

```
//               VOLUME=(PRIVATE,RETAIN),
//               DISP=(SHR,PASS)
//*
//            DD DSNAME=&PROJECT..SOURCE(&M6),
//               VOLUME=(PRIVATE,RETAIN),
//               DISP=(SHR,PASS)
//*
//            DD DSNAME=&PROJECT..SOURCE(&M7),
//               VOLUME=(PRIVATE,RETAIN),
//               DISP=(SHR,PASS)
//*
//            DD DSNAME=&PROJECT..SOURCE(&M8),
//               VOLUME=(PRIVATE,RETAIN),
//               DISP=(SHR,PASS)
//*
//* OUTPUT DATA SET - OBJECT MODULE
//*
//SYSLIN     DD DSN=&&OBJMOD,UNIT=&TEMP,
//              SPACE=(CYL,(5,2),RLSE),DISP=(NEW,PASS)
//*
//* INPUT/OUTPUT DATA SETS - SYSTEM OPERATION
//*
//SYSPRINT   DD SYSOUT=A
//*
//SYSUT1     DD UNIT=&TEMP,
//              SPACE=(TRK,(&PRIMARY,&SECNDRY))
//*
//SYSUT2     DD UNIT=(&TEMP,SEP=SYSUT1),
//              SPACE=(TRK,(&PRIMARY,&SECNDRY))
//*
//SYSUT3     DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2)),
//              SPACE=(TRK,(&PRIMARY,&SECNDRY))
//*
//SYSUT4     DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2,SYSUT3)),
//              SPACE=(TRK,(&PRIMARY,&SECNDRY))
//*
//*
//*
//CHLLE    EXEC PGM=IEWL,
//              COND=(5,LT,COBOL),
//              PARM='LIST,LET,XREF',
//              REGION=100K,
//              TIME=(1,0)
//*
//* LINK-EDIT THE OBJECT MODULE
//*
//*
//SYSLIB     DD DSNAME=&PROJECT..LOAD,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//           DD DSNAME=SYS1.COBLIB,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - OBJECT MODULE
//*
//SYSLIN     DD DSNAME=&&OBJMOD,
//              DISP=(SHR,PASS)
```

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Figure 8.2-o - continued. Cataloged Procedure AQCLC10

```
//*                                                                     00011700
//* OUTPUT DATA SET - LOAD MODULE                                       00011800
//*                                                                     00011900
//LOAD      DD DSNAME=&PROJECT.,LOAD,                                   00012000
//             VOLUME=(PRIVATE,RETAIN),                                 00012100
//             DISP=(SHR,PASS)                                          00012200
//*                                                                     00012300
//SYSLMOD   DD DSNAME=&PROJECT.,LOAD(&LOADMOD),                         00012400
//             VOLUME=(PRIVATE,RETAIN),                                 00012500
//             DISP=(OLD,PASS)                                          00012600
//*                                                                     00012700
//* INPUT/OUTPUT DATA SETS - SYSTEM OPERATION                           00012800
//*                                                                     00012900
//SYSUT1    DD UNIT=&TEMP,                                              00013000
//             SPACE=(&SPCUNIT,(&PRIM1,&PRIM2),,CONTIG)                 00013100
//*                                                                     00013200
//SYSPRINT  DD SYSOUT=A                                                 00013300
//*                                                                     00013400
```

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Figure 8.2-o - continued. Cataloged Procedure AQCLC10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g. the AQDHS-II source library is CN.EPALMH. A087.CDHS.HQ.AQS. SOURCE)
PARAM	'DMAP,SXREF,LIB,SIZE=114K, BUF=30K,STATE,FLOW=10'	Parameters used by the compiler. Information on these parameters can be found in the IBM COBOL Programmer's Guide
PRIMARY	50	Primary space allocation for temporary files used by compiler
SPCUNIT	TRK	Units in which space is to be allocated for temporary file used by linkage editor.

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Figure 8.2-p. Substitutable Parameters for AQCLC10

Parameter Name	Default Value	Description
SECNDRY	100	Secondary space allocation for temporary files used by compiler
M2 thru M8	NULL	Source library members concatenated onto the primary program (no source library members are concatenated onto any AQDHS-II program)
SOURCE	NULL	Name of source library module for program
LOADMOD	NULL	Name of load library module for program
PRIM1	60	Primary spaces allocation for temporary file used by linkage editor
PRIM2	60	Secondary space allocation for temporary file used by linkage editor
TEMP	SYSDA	Unit type specified for temporary file

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Figure 8.2-p - continued. Substitutable Parameters for AQCLC10

```
//*
//*   PROCEDURE NAME: AQCLF10
//*   REVISION LEVEL: 1-00
//*   LAST UPDATE #: 24
//*   DATE INCORPORATED: OCTOBER 31, 1978
//*
//*
//*   THIS PROCEDURE ALLOWS THE USER TO COMPILE AND LINK-EDIT FORTRAN
//*   PROGRAMS
//*
//*
//*
//AQCLF10 PROC PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',
//             PARAMC='MAP,ID',
//             PRIMARY=50,
//             SPCUNIT=TRK,
//             SECNDRY=100,
//             M2=NULL,
//             M3=NULL,
//             M4=NULL,
//             M5=NULL,
//             M6=NULL,
//             M7=NULL,
//             M8=NULL,
//             SOURCE=NULL,
//             LOADMOD=NULL,
//             PRIM1=60,
//             PRIM2=60,
//             TEMP=SYSDA
//*
//FORTRAN EXEC PGM=IEYFORT,
//             REGION=100K,
//             PARM='&PARAMC'
//*
//* EXECUTE THE FORTRAN COMPILER
//*
//*
//SYSLIB     DD DSNAME=&PROJECT..SOURCE,
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//* INPUT DATA SET - SOURCE MODULE
//*
//*
//SYSIN      DD DSNAME=&PROJECT..SOURCE(&SOURCE),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M2),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M3),
//              VOLUME=(PRIVATE,RETAIN),
//              DISP=(SHR,PASS)
//*
//           DD DSNAME=&PROJECT..SOURCE(&M4),
//              VOLUME=(PRIVATE,RETAIN),
```

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Figure 8.2-q. Cataloged Procedure AQCLF10

```
//               DISP=(SHR,PASS)                                        00005900
//*                                                                     00006000
//           DD DSNAME=&PROJECT..SOURCE(&M5),                           00006100
//               VOLUME=(PRIVATE,RETAIN),                               00006200
//               DISP=(SHR,PASS)                                        00006300
//*                                                                     00006400
//           DD DSNAME=&PROJECT..SOURCE(&M6),                           00006500
//               VOLUME=(PRIVATE,RETAIN),                               00006600
//               DISP=(SHR,PASS)                                        00006700
//*                                                                     00006800
//           DD DSNAME=&PROJECT..SOURCE(&M7),                           00006900
//               VOLUME=(PRIVATE,RETAIN),                               00007000
//               DISP=(SHR,PASS)                                        00007100
//*                                                                     00007200
//           DD DSNAME=&PROJECT..SOURCE(&M8),                           00007300
//               VOLUME=(PRIVATE,RETAIN),                               00007400
//               DISP=(SHR,PASS)                                        00007500
//*                                                                     00007600
//* OUTPUT DATA SET - OBJECT MODULE                                     00007700
//*                                                                     00007800
//SYSLIN DD DSN=&&OBJMOD,UNIT=&TEMP,                                    00007900
//           SPACE=(TRK,(5,2),RLSE),DISP=(NEW,PASS)                     00008000
//*                                                                     00008100
//* INPUT/OUTPUT DATA SETS - SYSTEM OPERATION                           00008200
//*                                                                     00008300
//SYSPRINT  DD SYSOUT=A                                                 00008400
//*                                                                     00008500
//SYSPUNCH  DD DUMMY                                                    00008600
//*                                                                     00008700
//SYSUT1    DD UNIT=&TEMP,                                              00008800
//             SPACE=(TRK,(&PRIMARY,&SECNDRY))                          00008900
//*                                                                     00009000
//SYSUT2    DD UNIT=(&TEMP,SEP=SYSUT1),                                 00009100
//             SPACE=(TRK,(&PRIMARY,&SECNDRY))                          00009200
//*                                                                     00009300
//SYSUT3    DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2)),                        00009400
//             SPACE=(TRK,(&PRIMARY,&SECNDRY))                          00009500
//*                                                                     00009600
//SYSUT4    DD UNIT=(&TEMP,SEP=(SYSUT1,SYSUT2,SYSUT3)),                 00009700
//             SPACE=(TRK,(&PRIMARY,&SECNDRY))                          00009800
//*                                                                     00009900
//*                                                                     00010000
//*                                                                     00010100
//LKED   EXEC PGM=IEWL,                                                 00010200
//             COND=(5,LT,FORTRAN),                                     00010300
//             PARM='LIST,LET,XREF',                                    00010400
//             REGION=100K,                                             00010500
//             TIME=(1,0)                                               00010600
//*                                                                     00010700
//* LINK-EDIT THE OBJECT MODULE                                         00010800
//*                                                                     00010900
//SYSLIB    DD DSNAME=&PROJECT..LOAD,                                   00011000
//             VOLUME=(PRIVATE,RETAIN),                                 00011100
//             DISP=(SHR,PASS)                                          00011200
//          DD DSNAME=SYS1.FORTLIB,                                     00011300
//             VOLUME=(PRIVATE,RETAIN),                                 00011400
//             DISP=(SHR,PASS)                                          00011500
//*                                                                     00011600
```

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Figure 8.2-q - continued. Cataloged Procedure AQCLF10

```
//* INPUT DATA SET - OBJECT MODULE                          00011700
//*                                                         00011800
//SYSLIN    DD DSNAME=&&OBJMOD,                             00011900
//             DISP=(SHR,PASS)                              00012000
//*                                                         00012100
//* OUTPUT DATA SET - LOAD MODULE                           00012200
//*                                                         00012300
//LOAD      DD DSNAME=&PROJECT..LOAD,                       00012400
//             VOLUME=(PRIVATE,RETAIN),                     00012500
//             DISP=(SHR,PASS)                              00012600
//*                                                         00012700
//SYSLMOD   DD DSNAME=&PROJECT..LOAD(&LOADMOD),             00012800
//             VOLUME=(PRIVATE,RETAIN),                     00012900
//             DISP=(OLD,PASS)                              00013000
//*                                                         00013100
//* INPUT/OUTPUT DATA SETS - SYSTEM OPERATION               00013200
//*                                                         00013300
//SYSPRINT  DD SYSOUT=A                                     00013400
//*                                                         00013500
//SYSUT1    DD UNIT=&TEMP,                                  00013600
//             SPACE=(&SPCUNIT,(&PRIM1,&PRIM2),,CONTIG)     00013700
//*                                                         00013800
```

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Figure 8.2-q - continued. Cataloged Procedure AQCLF10

Parameter Name	Default Value	Description
PROJECT	'CN.EPALMH.A087.CDHS.HQ.AQS'	Highest-level index of data set names (e.g. the AQDHS-II source library is CN.EPALMH. A087.CDHS.HQ.AQS. SOURCE)
PARAMC	'MAP,ID'	Parameters used by the compiler. Information can be found in the IBM FORTRAN programmer's guide
PRIMARY	50	Primary space allocation for temporary files used by compiler
SPCUNIT	TRK	Units in which space is to be allocated for temporary file used by linkage editor
SECNDRY	100	Secondary space allocation for temporary files used by compiler

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Figure 8.2-r. Substitutable Parameters for AQCLF10

Parameter Name	Default Value	Description
M2 thru M8	NULL	Source library members concatenated onto the primary program (No source library members are concatenated onto any AQDHS-II program)
SOURCE	NULL	Name of source library module
LOADMOD	NULL	Name of load library module
PRIM1	60	Primary space allocation for temporary file used by linkage editor
PRIM2	60	Secondary space allocations for temporary file used by linkage editor
TEMP	SYSDA	Unit type specified for temporary files

(Page 2 of 2)

Figure 8.2-r - continued. Substitutable Parameters for AQCLF10

8.3 INSTALLATION OF AQDHS-II

8.3.1 INTRODUCTION

The information contained in this section is intended to supplement the instructions in the letter sent with an installation package. Only those installations using standard IBM utilities are addressed herein.

To obtain a copy of AQDHS-II, a blank tape certified at 1600 BPI must be sent to NADB. The type of computer that will be used and the recording specifications for the tape should be specified in the letter.

A checklist of tasks for the installation is shown in Figure 8.3-a.

8.3.2 INITIAL PREPARATION

The installation package should contain a letter (see Figure 8.3-b); an installation deck and listing (see Figure 8.3-c); the tape containing AQDHS-II source, procedure, and test data sets; an AQDHS-II User's Guide; back copies of the CDHS User's Bulletin; a System Status/Hardware/Software Questionnaire (see Figure 8.3-d); and a copy of the Documentation of the AQDHS-II Test Run Series. If any of these items are missing, the user should report this problem to personnel at EPA-NADB.

The cards in the installation deck are not interpreted; however, the contents of each card can be printed on the cards by processing the deck through an interpreter (many keypunch machines have this feature). This interpreting should be done because changes must be made to the cards to reflect the user's particular data set names.

The data sets used for the source, load, procedure, and test libraries are created in the step named ALLOC using the IBM program IEFBR14. The names of these data sets should be changed to reflect the installation-dependent data set naming conventions. The space allocated assumes the use of 3330 disk packs; if other units are used, both the unit and the space allocations should be modified to reflect the units used. The value CDHSPK should be changed to indicate the volume serial number of the disk device used.

Data set names, units, and volume serial numbers in the remainder of the installation deck should also be changed to correspond with the values used in the ALLOC step.

The step named PUNCH punches the test run series on computer cards. The numbered PRINT steps (e.g., PRINT1, PRINT2,...) print the cataloged procedures, the test run series, and the source code of all programs. It may be desirable to run these steps separately since the program listings will generate a large volume of paper. To run these steps separately, the installation deck must be divided into several decks, each containing one or more steps.

8.3.3 INSTALLATION JOB EXECUTION

Once the installation deck has been modified, the installation job may be run. A job card must be added and sufficient time and page parameters should be specified (suggested time and page estimates are included in the installation deck as comments). Information on job cards can be is found in Section 8.1.

When the job has been run, the condition codes for each step should be verified. Condition codes should be 0 (zero) for successful completion (see Figure 8.3-e).

8.3.4 PROGRAM MODIFICATION

The AQDHS-II baseline programs should run with no modifications on most IBM computers. However, some changes may be necessitated by the file requirements of a particular installation. Information on AQDHS-II file specifications can be found in Appendix E. Note that the blocking factors for all files can be modified without affecting the program line numbers.

If the user's parameter, site, and parameter standards files will be larger than the size specified in the baseline versions (200 parameter records, 200 site records, and 100 standards records), all programs which store these files in tables should be modified as explained in Appendix C.

Non-IBM users will need to make more extensive modifications. Information on the changes required for each type of hardware can be obtained from EPA-NADB.

If other user-specified modifications are desired, a copy of the baseline version should also be maintained since all updates issued by NADB are for the baseline programs only. If line numbers in the user's program have been modified, an update to that program will not be applied correctly.

See Section 8.2.3.1 for additional information on program modification.

8.3.5 PROCEDURE MODIFICATION

The programs in AQDHS-II are executed using cataloged procedures. Information on cataloged procedures can be found in Section 8.1.6 and information on individual procedures can be found in the discussions of cataloged JCL which are included in the discussions of the AQDHS-II programs.

Each procedure contains substitutable parameters for such items as project, unit, and volume serial number. Each of these items may be changed at execution time following instructions given in the sample run streams. Since some of these variables remain fairly constant for a given installation, they may be changed in the procedures themselves so that the changes need not be made each time the procedure is executed. The substitutable parameters are listed on and immediately following the PROC statement for each procedure.

As an example of these changes, suppose the procedure contains the following statements:

```
//     PROJECT='CN.EPALMH.A087.CDHS.HQ.AQS',             00000800
//     UNIT=3330,                                        00000900
//     SERIAL=CDHSPK                                     00001000
```

Assume these variables have the values 'F734.CDHS.AQS', 2314, and PACK27 at a user's installation. He could then modify the procedure, replacing the three statements with the following statements:

```
//     PROJECT='F734.CDHS.AQS',                          00000800
//     UNIT=2314,                                        00000900
//     SERIAL=PACK27                                     00001000
```

The line numbers (columns 73-80) should be left as in the baseline version to facilitate updates to the procedures. Any substitutable parameter may be modified in a procedure without affecting the line numbers.

Procedures should be moved to a system procedure library once they have been tested. The user is advised to consult with his systems personnel before attempting to accomplish this step.

8.3.6 COMPILING PROGRAMS

Once IEHMOVE has been performed (step TAPIN of the installation deck) and the source programs are in the source library, the programs must be compiled and link edited. There are cataloged procedures in AQDHS-II to execute either the COBOL or FORTRAN compiler in conjunction with the linkage editor; the COBOL procedure is AQCLC10 and the FORTRAN procedure is AQCLF10. See Sections 8.2.4.1 and 8.2.4.2 for instructions on using these procedures.

After each program has been compiled and link edited, the condition codes for each step of the job should be checked to insure that they are either 4 or 0 (see Figure 8.2-k). Also, any error messages from the compile step (see Figure 8.2-l) should be inspected. If the return code is not 4 or 0 for any job step, contact personnel at NADB and forward the listing of that job to NADB. The printout from the linkage editor should indicate that the load module was added to the data set (see Figure 8.2-m).

8.3.7 TESTING THE SYSTEM

A test run series, stored in a test library, is provided on the installation tape to test all programs and procedures in AQDHS-II. The volume of the data in the test run series is much smaller than in the live data files most states maintain. Running tests with these smaller files means lower costs; also, there is no risk of destroying live files if any test should fail. The final AQDHS-II master, parameter, site, and parameter standards files created in the test run series should be stored on tape and used for testing future updates. This allows any program to be tested without requiring that the entire test run series be run to create these files. Information on the test run series can be found in the manual for APTI course 475.

8.3.8 COST CONSIDERATIONS

The following examples provide an estimate of the cost of creating the libraries, printing the listings, and compiling a program on an IBM 370/168.

Copy AQDHS-II from tape to disk using the IEHMOVE utility:

CPU time:	22 seconds
I/O time:	2 minutes 10 seconds
Total time:	2 minutes 32 seconds
Estimated cost:	$40.05

Print listings of the AQDHS-II programs:

Number of programs:	35 programs
Number of lines:	44,418 lines
CPU time:	18.27 seconds
I/O time:	2 minutes 20.13 seconds
Total time:	2 minutes 38.4 seconds
Estimated cost:	$28.13

Compile and link edit for program with 3800 statements:

CPU time:	22.7 seconds
I/O time:	1 minute 36.5 seconds
Total time:	1 minute 59.2 seconds
Estimated cost:	$25.43

8.3.9 WARNINGS AND SPECIAL INSTRUCTIONS

Each user is reminded not to make any modifications to AQDHS-II programs or procedures other than those modifications released or approved by NADB. Only the NADB baseline version of AQDHS-II will be supported by NADB. All modified versions (unless authorized to meet a specific computer system problem) must be supported by the organization which performs the modification.

If the user wishes to make modifications for his own purposes, he should make them to a copy of the baseline system. He should, however, maintain the baseline system with no changes. Thus, if a problem occurs in the user's system and it is reproduced in the baseline, the user should report the problem to NADB. If the problem occurs in the modified version only, it is the user's responsibility to correct the problem.

If there are any problems in installing AQDHS-II, contact NADB for further help.

The user should maintain a backup of the source, load, and procedure libraries as well as all files used in AQDHS-II. Systems personnel should be consulted on the proper techniques in creating backups of the AQDHS-II system.

_________Verify that the installation package contents are correct
_________Interpret installation deck
_________Modify installation deck as needed
_________Run installation job
_________Verify installation programs
_________Modify programs as needed
_________Compile and link edit all programs
_________Verify that all compiles and link edits are correct
_________Modify cataloged procedures as needed
_________Test programs and procedures
_________Move procedures to system libraries
_________Back up complete system
_________Create initial files with live data
_________Inform NADB that installation is complete using System Status/ Software/Hardware Questionnaire.

Figure 8.3-a. Checklist for Installing AQDHS-II

Ms. Virginia Sweetland
Boeing Computer Services
The Consulting Division
Mail Stop: 1E-04
P.O. Box 24346
Seattle, Washington 98124

Dear Ms. Sweetland:

Enclosed is a tape to which I have copied the AQDHS-II subsystem of CDHS. I am enclosing a copy of the JCL printout which resulted from the copy. Please note that the IBM utility IEHMOVE was used in creating your tape. Since IEHMOVE copies the data sets to your tape in an unloaded format, it will be necessary to use IEHMOVE to copy the system from this tape to your disk before you can obtain a readable printout. The tape was copied using no system labels and was recorded at 1600 BPI.

To aid you in the installation, I am also enclosing an "installation deck", which is set up for an IBM (OS) computer, and a listing of it. There are three data sets on your tape, each containing several members. These members are

DSNAME=CDHS.AQS.JCL
DSNAME=CDHS.AQS.JOBS
DSNAME=CDHS.AQS.SOURCE

Necessary disk space for each data set is allocated in the first step of the installation using IEFBR14. The actual copy from tape to disk is accomplished using IEHMOVE. The load modules will be created when you compile and link edit the programs. Also, if you wish to re-name the data sets when you copy then from tape to disk, you can do so by adding the appropriate control card in each COPY statement.

The installation deck is also set up to punch out all jobs required to accomplish the following:

Copy cataloged procedures to PROCLIB
Compile and link edit all programs
Run test programs using test data supplied with the installation (run in order)

It is also set up to print all the JOBS which were punched, as well as all source code and the JCL for all the cataloged procedures.

(page 1 of 4)

Figure 8.3-b. Installation Letter

Please note that it will be necessary for you to make changes to the installation deck to suit your local situation. For example, you may not use 3330 disk packs at your installation, and I am sure that your disk volume serial number will not be CDHSPK. Your tape unit designation may not be 2400, and you may wish to re-name the data sets when copying them from the tape to your disk.

After you have installed the system, it will be necessary for you to change several lines of coding in the cataloged procedures prior to copying them into your PROCLIB. A complete list of these procedures is attached.

Should you choose to retain the prefix of CDHS.AQS. for your data set names, you should change the appropriate line of each procedure to read:

```
//ddname PROC PROJECT='CDHS.AQS',
```

An equivalent change must also be made if you choose a different prefix for your data set names. Similar changes will be required in the data set names specified on the DD cards (DSNAME=CDHS.AQS.JOBS).

I urge you not to make any modifications other than those which must be made to the Job Control Language (JCL). NADB will make all modifications to the standard NADB system, and will support ONLY NADB-modified versions of the system.

If you wish to make modifications for your own purposes, you should make them to a copy of the baseline system. You should, however, maintain the baseline system incorporating only those changes distributed by NADB. This will give you an opportunity to test problems against the baseline. If you have a problem, and the problem is reproduced in the baseline, please report the problem to NADB. If the problem occurs in the modified version only, it is your responsibility to correct that problem.

Updates 1 through 24 have been incorporated into your system; thus, the next AQDHS-II update to your system will be number 25.

(page 2 of 4)

Figure 8.3-b - continued. Installation Letter

Also included are a copy of the AQDHS-II User's Guide, a copy of the Documentation of the AQDHS-II Test Run Series, all back issues of the CDHS User's Bulletin, and a copy of the System Status/Hardware/Software Questionnaire. This questionnaire should be completed and returned to me when your installation is complete.

If you have any questions, do not hesitate to call me at (919) 541-5491.

Sincerely yours,

Lloyd M. Hedgepeth
Project Officer
National Air Data Branch (MD-14)

Enclosures

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Figure 8.3-b - continued. Installation Letter

Attachment 1 - AQDHS-II Cataloged Procedures

AQCVM10
AQCVM20
AQCVP10
AQCVT10
AQEDT10
AQEMD10
AQEMM10
AQEMP10
AQEMS10
AQFMM10
AQMSM10
AQMSM20
AQRPD10
AQRPM05
AQRPM10
AQRPM15
AQRPM20
AQRPM25
AQRPM30
AQRPM35
AQRPM40
AQRPM45
AQRPP10
AQRPP20
AQRPS10
AQRPS20
AQRTM10
AQRTM20
AQRTM30
AQSRM10
AQSTM10
AQSTM20
AQCLC10
AQCLF10

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Figure 8.3-b - continued. Installation Letter

```
//* AQDHS INSTALLATION
//*
//* THIS JOB WILL SCRATCH AND RE-ALLOCATE ALL DATA SETS NECESSARY FOR
//*
//* THE INSTALLATION OF THE AQDHS.  IT WILL THEN COPY THE INSTALLATION
//*
//* TAPE INTO THESE DATA SETS AND PUNCH THE JOBS REQUIRED TO COMPILE
//*
//* AND LINK-EDIT THE VARIOUS PROGRAMS IN THE SYSTEM.  IT WILL THEN
//*
//* PRINT THOSE JOBS, THE CATALOGED PROCEDURES, THE LINKAGE EDITOR
//*
//* CONTROL CARDS, THE SORT CONTROL CARDS AND THE TEST DATA.  THE
//*
//* LISTING SHOULD BE EXAMINED TO BE CERTAIN THAT THE PROCEDURES ARE
//*
//* CORRECT FOR THIS PARTICULAR COMPUTER CENTER.  AFTER ANY NECESSARY
//*
//* CHANGES HAVE BEEN MADE, THE JOBS PUNCHED OUT MAY BE RUN
//*
//* SEQUENTIALLY TO INSTALL AND TEST THE AQDHS.
//*
//SCRATCH EXEC PGM=IEFBR14,
//             TIME=(0,5),
//             REGION=4K
//JCL       DD DISP=(OLD,DELETE),
//             DSNAME=CDHS.AQS.JCL
//JOBS      DD DISP=(OLD,DELETE),
//             DSNAME=CDHS.AQS.JOBS
//LOAD      DD DISP=(OLD,DELETE),
//             DSNAME=CDHS.AQS.LOAD
//SOURCE    DD DISP=(OLD,DELETE),
//             DSNAME=CDHS.AQS.SOURCE
//SYSIN     DD DISP=(OLD,DELETE),
//             DSNAME=CDHS.AQS.SYSIN
//ALLOC   EXEC PGM=IEFBR14,
//             REGION=4K,
//             TIME=(0,5)
//JCL       DD UNIT=3330,
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(20,10,5)),
//             DSNAME=CDHS.AQS.JCL
//JOBS      DD UNIT=3330,
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(10,10,5)),
//             DSNAME=CDHS.AQS.JOBS
//LOAD      DD UNIT=3330,
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(44,10,5)),
//             DSNAME=CDHS.AQS.LOAD
//SOURCE    DD UNIT=3330,
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(200,50,5)),
//             DSNAME=CDHS.AQS.SOURCE
//SYSIN     DD UNIT=3330,
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),
//             DISP=(NEW,CATLG,DELETE),
//             SPACE=(TRK,(5,5,5)),
//             DSNAME=CDHS.AQS.SYSIN
//TAPEIN  EXEC PGM=IEHMOVE,
```

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Figure 8.3-c. AQDHS-II Installation Deck

```
//             REGION=90K,                                              00006700
//             TIME=(5,0)                                               00006800
//SYSPRINT  DD SYSOUT=A                                                 00006900
//SYSUT1    DD UNIT=3330,                                               00007000
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),                      00007100
//             DISP=OLD                                                 00007200
//CDHSPK    DD UNIT=3330,                                               00007300
//             VOLUME=(PRIVATE,RETAIN,SER=CDHSPK),                      00007400
//             DISP=OLD                                                 00007500
//TAPE      DD UNIT=2400,                                               00007600
//             VOLUME=SER=AQSTAP,                                       00007700
//             DISP=(NEW,PASS),                                         00007800
//             LABEL=(,BLP),                                            00007900
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=800,DEN=3)                00008000
//SYSIN     DD *                                                        00008100
        COPY   TO=3330=CDHSPK,FROMDD=TAPE,FROM=TAPE=(AQSTAP,1),        X00008200
               PDS=CDHS.AQS.JCL                                         00008300
        COPY   TO=3330=CDHSPK,FROMDD=TAPE,FROM=TAPE=(AQSTAP,2),        X00008400
               PDS=CDHS.AQS.JOBS                                        00008500
        COPY   TO=3330=CDHSPK,FROMDD=TAPE,FROM=TAPE=(AQSTAP,3),        X00008600
               PDS=CDHS.AQS.SOURCE                                      00008700
        COPY   TO=3330=CDHSPK,FROMDD=TAPE,FROM=TAPE=(AQSTAP,4),        X00008800
               PDS=CDHS.AQS.SYSIN                                       00008900
//PUNCH   EXEC PGM=IEBPTPCH,                                            00009000
//             REGION=60K,                                              00009100
//             TIME=(1,0)                                               00009200
//SYSPRINT  DD SYSOUT=A                                                 00009300
//SYSUT1    DD DSNAME=CDHS.AQS.JOBS,                                    00009400
//             VOLUME=(PRIVATE,RETAIN),                                 00009500
//             DISP=(SHR,PASS)                                          00009600
//SYSUT2    DD SYSOUT=B                                                 00009700
//SYSIN     DD *                                                        00009800
        PUNCH TYPORG=PO,MAXNAME=2                                       00009900
//PRINT1  EXEC PGM=IEBPTPCH,                                            00010000
//             REGION=60K,                                              00010100
//             TIME=(1,0)                                               00010200
//SYSPRINT  DD SYSOUT=A                                                 00010300
//SYSUT1    DD DSNAME=CDHS.AQS.JCL,                                     00010400
//             VOLUME=(PRIVATE,RETAIN),                                 00010500
//             DISP=(SHR,PASS)                                          00010600
//SYSUT2    DD SYSOUT=A                                                 00010700
//SYSIN     DD *                                                        00010800
        PRINT  TYPORG=PO,MAXFLDS=1                                      00010900
        TITLE  ITEM=('  AQDHS-II CATALOGED PROCEDURES',1)               00011000
        TITLE  ITEM=(' ',1)                                             00011100
        RECORD FIELD=(80,1,,25)                                         00011200
//PRINT2  EXEC PGM=IEBPTPCH,                                            00011300
//             REGION=60K,                                              00011400
//             TIME=(1,0)                                               00011500
//SYSPRINT  DD SYSOUT=A                                                 00011600
//SYSUT1    DD DSNAME=CDHS.AQS.JOBS,                                    00011700
//             VOLUME=(PRIVATE,RETAIN),                                 00011800
//             DISP=(SHR,PASS)                                          00011900
//SYSUT2    DD SYSOUT=A                                                 00012000
//SYSIN     DD *                                                        00012100
        PRINT  TYPORG=PO,MAXFLDS=1                                      00012200
        TITLE  ITEM=('AQDHS-II INSTALLATION JOBS',1)                    00012300
        TITLE  ITEM=(' ',1)                                             00012400
        RECORD FIELD=(80,1,,25)                                         00012500
//PRINT3  EXEC PGM=IEBPTPCH,                                            00012600
//             REGION=60K,                                              00012700
//             TIME=(1,0)                                               00012800
//SYSPRINT  DD SYSOUT=A                                                 00012900
//SYSUT1    DD DSNAME=CDHS.AQS.SOURCE,                                  00013000
```

(page 2 of 3)

Figure 8.3-c - continued. AQDHS-II Installation Deck

```
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SYSUT2    DD SYSOUT=A
//SYSIN     DD *
       PRINT   TYPORG=PO,MAXFLDS=1
       TITLE   ITEM=('AQDHS-II SOURCE CUDE',1)
       TITLE   ITEM=(' ',1)
       RECORD  FIELD=(80,1,,25)
//PRINT4  EXEC PGM=IEBPTPCH,
//             REGION=60K,
//             TIME=(1,0)
//SYSPRINT  DD SYSOUT=A
//SYSUT1    DD DSNAME=CDHS.AQS.SYSIN,
//             VOLUME=(PRIVATE,RETAIN),
//             DISP=(SHR,PASS)
//SYSUT2    DD SYSOUT=A
//SYSIN     DD *
       PRINT   TYPORG=PO,MAXFLDS=1
       TITLE   ITEM=('  AQDHS-II SYSIN STATEMENTS',1)
       TITLE   ITEM=(' ',1)
       RECORD  FIELD=(80,1,,25)
```

(page 3 of 3)

Figure 8.3-c - continued. AQDHS-II Installation Deck

SYSTEM STATUS/HARDWARE/SOFTWARE QUESTIONNAIRE
(Please complete and return to NADB)

Agency: ____________________

Address: ____________________

____

HARDWARE

Location: ____________________

	IBM	UNIVAC	Other (Specify)
Model Number			
Series Number			
Core size (specify words or bytes)			
Operating System (specify OS-MFT, OS-MVT, OS-VSI, EXEC-8, etc.)			
Tape Drive (specify 7-track 556 bpi, 9-trach 1600 bpi, etc.)			
Disk Drive (specify 2314, 3330, etc.)			

SOFTWARE

Please list software items (installed, being installed, or planned) which are/will be peculiar to your installation and programs (e.g., tape management, spooling requirements, update utilities other than standard IBM utilities). We're specifically interested in any peculiarities of your computing systems which affect how an update is or can be incorporated.

____

____

____

____

____

(page 1 of 4)

Figure 8.3-d. System Status/Hardware/Software Questionnaire

SYSTEM STATUS/HARDWARE/SOFTWARE QUESTIONNAIRE

SUBSYSTEM STATUS

Air Quality Data Handling Subsystem II (AQDHS-II):

Installed? Yes ________ No ________

By whom? ____________________

Task order expiration (date) ____________________

Operational since (date) ____________________

Installation in progress? Yes ________ No ________

By whom? ____________________

Scheduled to be operational (date) ____________________

Installation planned? Yes ________ No ________

Installation schedule (dates) ____________________

Last update performed # ____________ Date ________

Emissions Inventory Subsystem/Permits and Registration (EIS/P&R):

Installed? Yes ________ No ________

By whom? ____________________

Task order expiration (date) ____________________

Operational since (date) ____________________

Installation in progress? Yes ________ No ________

By whom? ____________________

Scheduled to be operational (date) ____________________

Installation planned? Yes ________ No ________

Installation schedule (dates) ____________________

Last update performed # ____________ Date ________

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Figure 8.3-d - continued. System Status/Hardware/Software Questionnaire

SYSTEM STATUS/HARDWARE/SOFTWARE QUESTIONNAIRE

AIR POLLUTION CONTROL MANAGER:

Please furnish full title and address of the State and/or Local (county or municipal) agency responsible for all air pollution control activities of the agency and the name, title, address, and phone number of the agency's director.

Name and Title: ______________________________

Agency: ______________________________

Address: ______________________________

____

City: ______________ State: __________ Zip: ________

Phone Number(s): ______________________________

AQDHS-II DATA BASE COORDINATOR:

Name and Title: ______________________________

Address: ______________________________

____

City: ______________ State: __________ Zip: ________

Phone Number(s): ______________________________

EIS/P&R DATA BASE COORDINATOR:

Name and Title: ______________________________

Address: ______________________________

____

City: ______________ State: __________ Zip: ________

Phone Number(s): ______________________________

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Figure 8.3-d - continued. System Status/Hardware/Software Questionnaire

SYSTEM STATUS/HARDWARE/SOFTWARE QUESTIONNAIRE

DATA PROCESSING PERSONNEL:

Director:

Name and Title: ____________________

Address: ____________________

____

City: __________ State: __________ Zip: ______

Phone Number(s): ____________________

AQDHS-II Contact (person responsible for performing updates):

Name and Title: ____________________

Address: ____________________

____

City: __________ State: __________ Zip: ______

Phone Number(s): ____________________

EIS/P&R Contact (person responsible for performing updates):

Name and Title: ____________________

Address: ____________________

____

City: __________ State: __________ Zip: ______

Phone Number(s): ____________________

Contract Support:

Please identify contractor and furnish name, address and phone number(s) of any contract personnel supporting your CDHS subsystems.

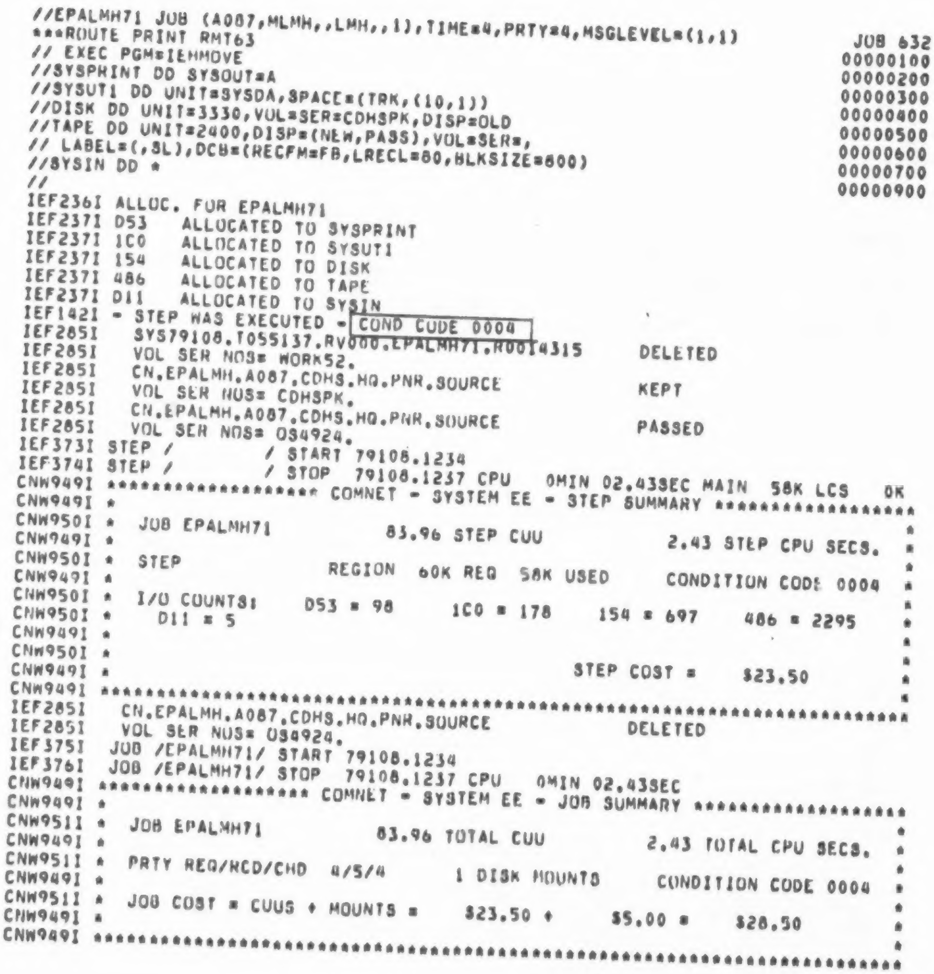
____

____

____

(page 4 of 4)

Figure 8.3-d - continued. System Status/Hardware/Software Questionnaire



```
//EPALMH71 JUB (A087,MLMH,,LMH,,1),TIME=4,PRTY=4,MSGLEVEL=(1,1)
***ROUTE PRINT RMT63                                                    JOB 632
// EXEC PGM=IEHMOVE                                                     00000100
//SYSPRINT DD SYSOUT=A                                                  00000200
//SYSUT1 DD UNIT=SYSDA,SPACE=(TRK,(10,1))                               00000300
//DISK DD UNIT=3330,VOL=SER=CDHSPK,DISP=OLD                             00000400
//TAPE DD UNIT=2400,DISP=(NEW,PASS),VOL=SER=,                           00000500
// LABEL=(,SL),DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)                      00000600
//SYSIN DD *                                                            00000700
//                                                                      00000900
IEF236I ALLOC. FOR EPALMH71
IEF237I D53   ALLOCATED TO SYSPRINT
IEF237I 1C0   ALLOCATED TO SYSUT1
IEF237I 154   ALLOCATED TO DISK
IEF237I 486   ALLOCATED TO TAPE
IEF237I D11   ALLOCATED TO SYSIN
IEF142I - STEP WAS EXECUTED - COND CODE 0004
IEF285I   SYS79108.T055137.RV000.EPALMH71.R0014315      DELETED
IEF285I   VOL SER NOS= WORK52.
IEF285I   CN.EPALMH.A087.CDHS.HQ.PNR.SOURCE             KEPT
IEF285I   VOL SER NOS= CDHSPK.
IEF285I   CN.EPALMH.A087.CDHS.HQ.PNR.SOURCE             PASSED
IEF285I   VOL SER NOS= 034924.
IEF373I STEP /        / START 79108.1234
IEF374I STEP /        / STOP  79108.1237 CPU    0MIN 02.43SEC MAIN  58K LCS   0K
CNW949I ******************** COMNET - SYSTEM EE - STEP SUMMARY ******************
CNW949I *                                                                        *
CNW950I *  JOB EPALMH71              83.96 STEP CUU           2.43 STEP CPU SECS.  *
CNW949I *                                                                        *
CNW950I *  STEP               REGION  60K REQ  58K USED      CONDITION CODE 0004  *
CNW949I *                                                                        *
CNW950I *  I/O COUNTS:    D53 = 98      1C0 = 178    154 = 697     486 = 2295     *
CNW950I *    D11 = 5                                                             *
CNW949I *                                                                        *
CNW950I *                                                                        *
CNW949I *                                      STEP COST =    $23.50             *
CNW949I **************************************************************************
IEF285I   CN.EPALMH.A087.CDHS.HQ.PNR.SOURCE             DELETED
IEF285I   VOL SER NOS= 034924.
IEF375I  JOB /EPALMH71/ START 79108.1234
IEF376I  JOB /EPALMH71/ STOP  79108.1237 CPU   0MIN 02.43SEC
CNW949I ******************** COMNET - SYSTEM EE - JOB SUMMARY *******************
CNW949I *                                                                        *
CNW951I *  JOB EPALMH71              83.96 TOTAL CUU          2.43 TOTAL CPU SECS. *
CNW949I *                                                                        *
CNW951I *  PRTY REQ/RCD/CHD  4/5/4       1 DISK MOUNTS    CONDITION CODE 0004     *
CNW949I *                                                                        *
CNW951I *  JOB COST = CUUS + MOUNTS =    $23.50 +     $5.00 =    $28.50          *
CNW949I *                                                                        *
CNW949I **************************************************************************
```

8.3-e. Condition Code for IEHMOVE

APPENDIX A - CODE TABLES

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INTRODUCTION

This appendix lists the commonly used codes associated with AQDHS-II. Included are codes for: agency, project, sampling interval (time codes), units, and negative value parameters. If these codes are not comprehensive enough, refer to Aeros Manual Series, Volume V: AEROS Manual of Codes.

Table A-1. Agency Codes

Agency Codes

Code	Agency
A	EPA group responsible for atmospheric surveillance
B	EPA group responsible for meteorological activity
C	EPA group responsible for effects research
D	EPA group responsible for atmospheric research
E	EPA group responsible for abatement activity
F	State agency
G	County agency
H	City agency
I	District agency
J	Private
K	Institution (university, college, etc.)
L	Military
M	International agency
N	Other Federal nonmilitary agencies
O-Y	Open for future expansion
Z	Other

Table A-2. Project Codes

Project Codes

Long-term Surveillance

Code	Project
01	Population-oriented surveillance
02	Source-oriented ambient surveillance
03	Background surveillance

Short-term Surveillance

Code	Project
04	Complaint investigation
05	Special studies
06	Episode monitoring

Table A-3. Time Codes

Interval	SAROAD Time Code	AQDHS-II Time Code	Valid Start Hours
One-hour	1	1	00, 08, 16 (AQDHS-II); 00, 12 (SAROAD)
Two-hour	2	2	00, 01, 16, 17 (AQDHS-II); 00, 01 (SAROAD)
Three-hour	B	3	00, 01, 02
Four-hour	3	4	00, 01, 02, 03
Six-hour	4	5	00, 01, 02, 03, 04, 05
Eight-hour	5	6	00, 01, 02, 03, 04, 05, 06, 07
Twelve-hour	6	7	00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11
Daily	7	8	00-23
Weekly	A	9	00-23
Monthly	8	A	00-23
Quarterly	9	B	00-23
Composite	C	C	

Table A-4. Units Codes

Units Codes

Code	Units
01	micrograms/cubic meter (25^0 c, 1013 millibars)
02	micrograms/cubic meter (0^0 C, 1013 millibars)
03	nanograms/cubic meter (25^0 C, 1013 millibars)
04	nanograms/cubic meter (0^0 C, 1013 millibars)
05	milligrams/cubic meter (25^0 C, 1013 millibars)
06	milligrams/cubic meter (0^0 C, 1013 millibars)
07	parts per million (volume/volume)
08	parts per billion (volume/volume)
09	COHS/1000 linear feet
10	RUDS/10,000 linear feet
11	meters/second
12	miles/hour
13	knots
14	degrees
20	microns
30	picocuries/cubic meter
31	microcuries/cubic meter
32	picocuries/square meter
33	microcuries/square meter
34	picocuries/cubic centimeter
35	picocuries/gram
50	number of threshold levels
70	milligrams F/100 square centimeters-day
80	milligrams SO_3/100 square centimeters-day
81	micrograms SO_2/square meter-day

Table A-4 - Continued. Units Codes

Units Codes

Code	Units
90	tons/square mile-month[a]
91	milligrams/square centimeter-month[a]
92	micrograms/cubic meter-month[a]
98	milligrams SO_4/square centimeters-30 days
99	milligrams/square centimeters-30 days

---

[a] On a calendar-month basis.

Table A-5. Valid Negative Value Parameters

Parameter Number	Name
61202	Lapse Rate
62101	Temperature
62103	Dew Point
62104	Temperature, 24-hour Maximum
62105	Temperature, 24-hour Minimum
62106	Temperature Difference

Table A-6. Maximum Values for Parameters

Parameter Number	Units Code	Maximum Value
11101	01	2000.0
11101	02	2183.3
42101	05	115.0
42101	06	125.5
42101	07	100.0
42401	01	5240.0
42401	02	5720.5
42401	07	2.0
42401	08	2000.0
42601	01	3690.0
42601	02	4028.4
42601	07	3.0
42601	08	3000.0
42602	01	3760.0
42602	02	4104.8
42602	07	2.0
42602	08	2000.0
42603	01	9400.0
42603	07	5.0
42603	08	5000.0
43101	01	9810.0
43101	05	9.8
43101	06	10.7
43101	07	15.0
43102	01	6540.0
43102	02	7139.8
43102	05	6.6
43102	07	10.0
44101	01	1372.0
44101	02	1497.8
44101	07	0.7
44101	08	700.0
44103	01	1372.0
44103	02	1497.8
44103	07	0.7
44103	08	700.0
44201	01	1372.0
44201	02	1497.8
44201	07	0.7
44201	08	700.0
61102	14	360.0

APPENDIX B - ERROR MESSAGES

Error messages indicate any problems encountered in a particular execution of a program. Errors are grouped into categories according to the severity of the error and its effect on the execution of the program. These categories are as follows:

Warning: A warning-category error does not cause termination of program execution or rejection of input data, but informs the user of an aspect of the input data that may warrant his attention. Warning messages are normally suppressed, and the user must specify an option to have them printed.

Conditional: A conditional-category error does not cause termination of program execution or rejection of input data. It informs the user that an entry in the input data may be in error and should be examined and verified. Conditional messages cannot be suppressed.

Error: An error-category error does not cause termination of program execution; however, the input data in which the error was detected is rejected. Error messages cannot be suppressed.

Abort: An abort-category error causes termination of program execution. The user can recover from an abort by correcting the condition(s) that caused the abort. Abort messages cannot be suppressed.

Disaster: A disaster-category error causes termination of program execution and is caused by a situation from which the user cannot recover directly. Disaster messages are not expected to occur in normal operation, thus when a disaster does occur, it is important that the user contact personnel at NADB to obtain troubleshooting assistance. Disaster messages cannot be suppressed.

The error messages which are generated during the execution of a program are printed in the diagnostic report for that program along with summary statistics which give a count, by category, of the errors encountered. Each error message is printed with a beginning indicator of three asterisks (***) followed by the program name. The program name is printed to clearly indicate in which program the error was encountered. This eliminates any ambiguity when more than one program is run in a job stream. The error messages within each program are numbered sequentially by a three-digit number, starting with 001; this number is printed following the program name. Following this number, the error category and the message are printed. Error messages which pertain to a transaction are printed immediately after an image of that transaction. The entire transaction is edited for errors; and, since it is possible that more than one error may be detected, multiple error messages may be printed.

All of the error messages produced by the AQDHS-II programs are included in this appendix and are also listed in the discussions of the individual programs (Sections 4 thru 6) in this user's guide. Each message is listed exactly as it would be printed in the diagnostic report. A brief description of the conditions which would have caused the error; what effect, if any, the error had on the execution of the program; and what, if anything, the user can do to correct the error are also given for each message.

- ACVANOM -

ACVANOM 001 CONDITIONAL - NO INPUT RECORDS

Meaning: The input master file contains no records.
Action: Verify that the correct file was input.

ACVANOM 002 ABORT - PARAMETER TABLE OVERFLOW

Meaning: The number of parameter file records in the parameter file for pollutants that fall into the categories in Figure 5.5.5-a is greater than the maximum allowed.
Action: See Appendix C for instructions on increasing the allowed size.

ACVANOM 003 ABORT - NUMBER OF PARAMETER CODE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: ACVANOM (AQ0040) attempted to enter more parameter file records than the parameter table can hold.
Action: See Appendix C for instructions on increasing the allowed size of the parameter file.

ACVANOM 004 ABORT - NO MATCH FOUND ON PARAMETER FILE FOR ZZZZZZZZZ

Meaning: A record was found in the master file containing parameter-method-unit key ZZZZZZZZZ, but no record was found in the parameter file for this parameter-method-unit key.
Action: Verify that the correct input files were used. If the master file is in error, correct using programs AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). If the parameter file is in error, correct using programs ASRPARM (AQ0150) and AEMPARM (AQ0070). After appropriate corrections have been made, re-execute ACVANOM (AQ0040).

ACVANOM 005 ABORT - INVALID OPTION SPECIFIED

Meaning: The option on the option card is invalid.

Action: Correct or delete the option card. Re-execute ACVANOM (AQ0040).

ACVANOM 006 CONDITIONAL - STD UNITS CONV FAC OF ZERO ENCOUNTERED, SCREENING NOT PERFORMED (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ)

Meaning: A zero standard units conversion factor was found in the parameter file for parameter-method-unit key ZZZZZZZZZ; the master file record containing readings for this parameter-method-unit key was bypassed. (XXXXXXXXXXXXX is the state-area-site-agency-project-time codes and YYYYYY is the year-month-day of the bypassed master file record.)

Action: Modify the parameter file using programs ASRPARM (AQ0150) and AEMPARM (AQ0070) to enter a non-zero standard units conversion factor for parameter-method-unit key ZZZZZZZZZ. Re-execute ACVANOM (AQ0040).

ACVANOM 007 CONDITIONAL - READING(S) > 9999.9999 IN STD UNITS, SCREENING NOT PERFORMED (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ)

Meaning: One or more readings in the master file record exceed 9999.9999 when converted to standard units (XXXXXXXXXXXXX is the state-area-site-agency-project-time codes, YYYYYY is the year-month-day and ZZZZZZZZZ is the parameter-method-unit key). This record is bypassed.

Action: Examine the readings in this record to insure that all are correct. Any readings found to be in error should be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100).

- ACVMFOR -

ACVMFOR 001 ERROR - NO INPUT RECORDS - OUTPUT UNUSABLE

Meaning: There are no records in the specified input master file; thus, the output file consists only of a header record and a trailer record.

Action: Specify a valid master file and resubmit.

- ACVPFOR -

*** ACVPFOR 001 ERROR - NO INPUT RECORDS, OUTPUT UNUSABLE

Meaning: The input AQDHS-II parameter file contains no records; therefore, the output file contains only a header record and a trailer record.

Action: Check the input AQDHS-II parameter file to insure that it is the proper file. Correct the error and resubmit the job.

- ACVSARD -

ACVSARD 001 ERROR - INVALID ACTION CODE, SKIPPING TO NEXT ACTION CARD

Meaning: The only valid action codes are 1 (delete), 2 (add), 3 (change), and 4 (sent). All transactions are read and ignored until a valid action card is read.

Action: If the transactions were not processed correctly due to this error, correct the action card and resubmit the job.

ACVSARD 002 ERROR - NON-NUMERIC ACTION CODE, SKIPPING TO NEXT ACTION CARD

Meaning: The only valid action codes are 1 (delete), 2 (add), 3 (change), and 4 (sent). All transactions are read and ignored until a valid action card is read.

Action: If the transactions were not processed correctly due to this error, correct the action card and resubmit the job.

ACVSARD 003 ERROR - INVALID SAROAD FORM NUMBER, CARD REJECTED

Meaning: The valid SAROAD form numbers are 1, 2, and 3.

Action: Correct the form number and resubmit the job.

ACVSARD 004 ERROR - NON-NUMERIC SAROAD FORM NUMBER, CARD REJECTED

Meaning: The valid SAROAD form numbers are 1, 2, and 3.

Action: Correct the form number and resubmit the job.

ACVSARD 005 ERROR - NON-NUMERIC START HOUR, CARD REJECTED

Meaning: The start hour must be numeric. The valid start hours are shown in Appendix A, Table 3.

Action: Correct the start hour and resubmit the job.

ACVSARD 006 ERROR - START HOUR INCOMPATIBLE WITH TIME CODE, CARD REJECTED

Meaning: The start hour was not valid for the time code on the transaction. See Appendix A, Table 3 for a table of valid start hour/time code combinations.

Action: Correct start hour and/or time code and resubmit the job.

ACVSARD 007 ERROR - INVALID TIME CODE, CARD REJECTED

Meaning: The time code was invalid. See Appendix A, Table 3 for valid time codes.

Action: Correct time code and resubmit the job.

ACVSARD 008 CONDITIONAL - INVALID OPTION CARD, DEFAULT (NOLIST) IS USED

Meaning: An invalid option was specified; therefore, the default option NOLIST was used.

Action: No action is necessary if it is acceptable to have no listing of transactions; otherwise, correct the option card and resubmit the job.

ACVSARD 009 CONDITIONAL - NO OPTION CARD, DEFAULT OPTION (NOLIST) USED

Meaning: No option card was entered; therefore, the default option NOLIST was used.

Action: No action is necessary if it is acceptable to have no listing of transactions; otherwise, include an option card and resubmit the job.

- ACVUNIT -

ACVUNIT 001 ABORT - PARAMETER TABLE OVERFLOWED

Meaning: The input parameter file contains too many entries for the parameter table size which is set at 200. Therefore, the run was terminated.

Action: If this set size is too small, increase the size as necessary. See Appendix C for instructions on increasing the allowed table size.

ACVUNIT 002 CONDITIONAL - NO OPTION CARD - DEFAULT OF STANDARD USED

Meaning: Although no option card was input, the program was executed using the 'STD' option.

Action: If the 'USER' option is desired, enter USER on the option card and resubmit the job.

ACVUNIT 003 CONDITIONAL - INVALID OPTION CARD - DEFAULT OF STANDARD USED

Meaning: Although an invalid option card was input, the program was executed using the 'STD' option.

Action: If the 'USER' option is desired, enter USER on the option card and resubmit the job.

ACVUNIT 004 CONDITIONAL - CONVERTED DATA FIELD TOO LARGE - RESULT IS INVALID

Meaning: The data value calculated was greater than 9999. The value appearing in the master file is invalid.

Action: The user may want to specify a different units code and conversion factor in the parameter file.

ACVUNIT 005 CONDITIONAL - CONVERTED DATA FIELD TOO SMALL - RESULT IS INVALID

Meaning: The data value calculated was smaller than 0.0001. A value of 0 will appear in the master file.

Action: The user may want to specify a different units code and conversion factor in the parameter file.

ACVUNIT 006 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARM TABLE SIZE

Meaning: The program has been incorrectly modified to increase the parameter table. Therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

Two special error messages may be printed at the end of the program. Each message will be printed along with a listing of the parameters to which it refers.

ACVUNIT 007 THE FOLLOWING PARAMETER/METHOD/UNIT CODE COMBINATIONS WERE NOT ON THE PARAMETER FILE

Meaning: The parameter/method/unit code combinations listed were on the master file but were not on the parameter file used. No conversion was made for these codes.

Action: If necessary, update the parameter file to include the listed parameter/method/unit code combinations, then resubmit the job.

ACVUNIT 008 THE FOLLOWING PARAMETER/METHOD/UNIT CODE COMBINATIONS HAD NO CONVERSION FACTOR ON THE PARAMETER FILE

Meaning: The parameter/method/unit code combinations listed were on the master file but did not have a conversion factor on the parameter file used. No conversion was made for these codes.

Action: If necessary, update the parameter file to include conversion factors for the listed parameter/method/unit code combinations, then resubmit the job.

-AEDMSTR-

AEDMSTR 001 ERROR - COLUMN 01 - INVALID TRANSACTION CODE - CARD REJECTED
Meaning: The only valid transaction codes are 1, 2, and 3.
Action: Correct and resubmit.

AEDMSTR 002 ERROR - COLUMN 01 - NON-NUMERIC TRANSACTION CODE - CARD REJECTED
Meaning: The only valid transaction codes are 1, 2, and 3.
Action: Correct and resubmit.

AEDMSTR 003 ERROR - COLUMN 80 - INVALID ACTION CODE - CARD REJECTED
Meaning: The only valid action codes are 1 (Delete), 2 (Add), and 3 (Change).
Action: Correct and resubmit.

AEDMSTR 004 ERROR - COLUMN 80 - NON-NUMERIC ACTION CODE - CARD REJECTED
Meaning: The only valid action codes are 1 (Delete), 2 (Add), and 3 (Change).
Action: Correct and resubmit.

AEDMSTR 00 ERROR - COLUMN xx - INVALID TIME CODE - CARD REJECTED
Meaning: The time code beginning in column xx is invalid. The valid time codes are shown in Appendix A, Table 3.
Action: Correct and resubmit.

AEDMSTR 006 ERROR - COLUMN 02 - NON-NUMERIC STATE CODE - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 007 ERROR - COLUMN 02 - INVALID STATE CODE - CARD REJECTED
Meaning: The state code is not in the site file.
Action: Correct the state code or update the site file and resubmit.

AEDMSTR 008 ERROR - COLUMN xx - NON-NUMERIC AREA CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 009 ERROR - COLUMN xx - NON-NUMERIC SITE CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 010 ERROR - COLUMN xx - NON-ALPHABETIC AGENCY CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 011 ERROR - COLUMN xx - NON-NUMERIC PROJECT CODE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 012 ERROR - COLUMN xx - NON-NUMERIC TIME CODE - CARD REJECTED

Meaning: The time code beginning in column xx is invalid. The valid time codes are shown in Appendix A, Table 3.

Action: Correct and resubmit.

AEDMSTR 013 ERROR - COLUMN xx - NON-NUMERIC YEAR - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 014 ERROR - COLUMN xx - YEAR LESS THAN SIXTY - CARD REJECTED

Meaning: SAROAD does not accept data prior to 1960.

AEDMSTR 015 ERROR - COLUMN xx - NON-NUMERIC MONTH - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 016 ERROR - COLUMN xx - MONTH ZERO OR GREATER THAN TWELVE - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 017 ERROR - COLUMN xx - NON-NUMERIC DAY - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 018 ERROR - COLUMN xx - INVALID DAY - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 019 ERROR - COLUMN xx - NON-NUMERIC START HOUR - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 020 ERROR - COLUMN xx - DECIMAL POSITION GREATER THAN FOUR - CARD REJECTED
Meaning: AQDHS-II currently will not accept a decimal position greater than four.
Action: Change units, data value, and decimal code to accomodate the new decimal and resubmit.

AEDMSTR 021 ERROR - COLUMN xx - NON-NUMERIC PARAMETER CODE - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 022 ERROR - COLUMN xx - NON-NUMERIC METHOD CODE - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 023 ERROR - COLUMN xx - NON-NUMERIC UNITS CODE - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 024 ERROR - COLUMN xx - NON-NUMERIC DECIMAL POSITION - CARD REJECTED
Action: Correct and resubmit.

AEDMSTR 025 ERROR - COLUMN 21 - START HOUR INVALID FOR TIME CODE - CARD REJECTED

Meaning: See Appendix A, Table 3 for valid time codes versus start hour.
Action: Correct and resubmit.

AEDMSTR 026 WARNING - COLUMN xx - START HOUR GREATER THAN TWENTY-THREE - CARD ACCEPTED

Meaning: An erroneous start hour has been coded; however, this will not affect the operation of the programs or the file sequence (for Form 2 and 3 data only).
Action: No action required.

AEDMSTR 027 ERROR - COLUMN xx - NON-NUMERIC READING - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 028 ERROR - RECORD CONTAINS NO READINGS - CARD REJECTED

Meaning: The transaction contains no readings for Form 1 data or no key information and readings for Form 2 and Form 3 data.
Action: Correct and resubmit.

AEDMSTR 029 ERROR - COLUMN 19 - NON-NUMERIC NUMBER OF SAMPLES - CARD REJECTED

Action: Correct and resubmit.

AEDMSTR 030 ERROR - COLUMN 22 - INVALID COMPOSITE TIME CODE - CARD REJECTED

Meaning: The only valid composite time codes are 1-9, A, and B.
Action: Correct and resubmit.

AEDMSTR 031 ERROR - COLUMN 21 - NON-NUMERIC COMPOSITE TYPE - CARD REJECTED

Meaning: The only valid composite type codes are 1 (Quarterly), 2 (Seasonal), 3 (Monthly), 4 (Weekly), and 5 (Annual).

Action: Correct and resubmit.

AEDMSTR 032 ERROR - COLUMN 17 - NON-NUMERIC PERIOD - CARD REJECTED

Meaning: The composite period field contains non-numeric data.

Action: Correct and resubmit.

AEDMSTR 033 ERROR - COLUMN 17 - INVALID PERIOD - CARD REJECTED

Meaning: The composite period field contains invalid data; see Section 4.5.1.2, Figure 4.5.1-b for the valid codes.

Action: Correct and resubmit.

AEDMSTR 034 ERROR - COLUMN 21 - INVALID COMPOSITE TYPE - CARD REJECTED

Meaning: See Section 4.5.1.2, Figure 4.5.1-b for the valid codes.

Action: Correct and resubmit.

AEDMSTR 035 ERROR - COLUMN xx - INVALID AREA CODE - CARD REJECTED

Meaning: The area code specified is not in the site file.

Action: Correct the area code or update the site file and resubmit.

AEDMSTR 036 ERROR - COLUMN xx - INVALID SITE CODE - CARD REJECTED

Meaning: The site code specified is not in the site file.

Action: Correct the site code or update the site file and resubmit.

AEDMSTR 037 ERROR - COLUMN xx - INVALID AGENCY CODE - CARD REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 038 ERROR - COLUMN xx - INVALID PROJECT CODE - CARD REJECTED

Meaning: The project code specified is not in the site file.

Action: Correct the project code or update the site file and resubmit.

AEDMSTR 039 ERROR - COLUMN xx - INVALID PARAMETER CODE - CARD REJECTED

Meaning: The parameter code specified is not in the parameter file.

Action: Correct the parameter code or update the parameter file and resubmit.

AEDMSTR 040 ERROR - COLUMN xx - INVALID METHOD CODE - CARD REJECTED

Meaning: The method code specified is not in the parameter file.

Action: Correct the method code or update the parameter file and resubmit.

AEDMSTR 041 ERROR - COLUMN xx - INVALID UNITS CODE - CARD REJECTED

Meaning: The units code specified is not in the parameter file.

Action: Correct the units code or update the parameter file and resubmit.

AEDMSTR 042 CONDITIONAL - COLUMN xx - READING EXCEEDS MAXIMUM PERMITTED

Meaning: The reading exceeds the SAROAD maximum value allowed for the parameter. However, the data is accepted.

Action: If this value is correct, notify EPA, in writing, when you submit your data that you have already verified the reading and that it should be included in SAROAD.

AEDMSTR 043 CONDITIONAL - COLUMN xx - READING EXCEEDS MAXIMUM PERMITTED

Meaning: The reading exceeds the SAROAD maximum value allowed for the parameter. However, the data is accepted.

Action: If this value is correct, notify EPA, in writing, when you submit your data that you have already verified the reading and that it should be included in SAROAD.

AEDMSTR 044 ERROR - COLUMN 79 - INVALID STATUS FLAG - CARD REJECTED

Meaning: Blank and S are the only valid transaction status flag values. Moreover, S is only valid for add transactions.

Action: Correct and resubmit.

AEDMSTR 045 ERROR - COLUMN xx - INVALID START HOUR (READINGS SPAN END OF DAY - REJECTED

Meaning: See Appendix A, Table 3 for valid start hours.

Action: Correct and resubmit.

AEDMSTR 046 CONDITIONAL - MISSING OR INVALID OPTION CARD - DEFAULT OPTIONS USED

Meaning: An invalid option or no option has been specified. The program was executed using the default options NOLIST and NOFLAGW.

AEDMSTR 047 ERROR - COLUMN xx - INVALID AREA CODE - GROUP yy REJECTED

Meaning: The area code specified is not in the site file.

Action: Correct the area code or update the site file and resubmit.

AEDMSTR 048 ERROR - COLUMN xx - INVALID SITE CODE - GROUP yy REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 049 ERROR - COLUMN xx - INVALID AGENCY CODE - GROUP yy REJECTED

Meaning: The agency code specified is not in the site file.

Action: Correct the agency code or update the site file and resubmit.

AEDMSTR 050 ERROR - COLUMN xx - INVALID PROJECT CODE - GROUP yy REJECTED

Meaning: The project code specified is not in the site file.

Action: Correct the project code or update the site file and resubmit.

AEDMSTR 051 ERROR - COLUMN xx - INVALID PARAMETER CODE - GROUP yy REJECTED

Meaning: The parameter code specified is not in the parameter file.

Action: Correct the parameter code or update the parameter file and resubmit.

AEDMSTR 052 ERROR - COLUMN xx - INVALID METHOD CODE - GROUP yy REJECTED

Meaning: The method code specified is not in the parameter file.

Action: Correct the method code or update the parameter file and resubmit.

AEDMSTR 053 ERROR - COLUMN xx - INVALID UNITS CODE - GROUP yy REJECTED

Meaning: The units code specified is not in the parameter file.

Action: Correct the units code or update the parameter file and resubmit.

AEDMSTR 054 ERROR - COLUMN xx - DECIMAL POSITION GREATER THAN FOUR - GROUP yy REJECTED

Meaning: AQDHS-II currently will not accept a decimal position greater than four.

Action: Change units, data value, and decimal code to accomodate the new decimal and resubmit.

AEDMSTR 055 ERROR - COLUMN xx - NON-NUMERIC DECIMAL POSITION - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 056 ERROR - COLUMN xx - NON-NUMERIC AREA CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 057 ERROR - COLUMN xx - NON-NUMERIC SITE CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 058 ERROR - COLUMN xx - NON-NUMERIC PARAMETER CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 059 ERROR - COLUMN xx - NON-NUMERIC METHOD CODE - GROUP yy REJECTED

Action: Correct and resubmit.

AEDMSTR 060 ERROR - COLUMN xx - NON-NUMERIC UNIT CODE - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 061 ERROR - COLUMN xx - NON-NUMERIC READING - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 062 ERROR - COLUMN xx - NON-NUMERIC START HOUR - GROUP yy REJECTED
Action: Correct and resubmit.

AEDMSTR 063 ERROR - COLUMN xx - INVALID NEGATIVE DATA FORMAT - GROUP yy REJECTED
Meaning: Negative data must adhere to the following format: -ddd where d is any digit 0-9.
Action: Correct and resubmit.

AEDMSTR 064 ERROR - COLUMN xx - DATA MUST BE POSITIVE FOR THIS PARM - GROUP yy REJECTED
Meaning: Check the parameter code and the reading for consistency (see Appendix A, Table 5 for valid negative parameters).
Action: Correct and resubmit.

AEDMSTR 065 ERROR - COLUMN xx - INVALID NEGATIVE DATA FORMAT - CARD REJECTED
Meaning: Negative data must adhere to the following format: -ddd where d is any digit 0-9.
Action: Correct and resubmit.

AEDMSTR 066 ERROR - COLUMN xx - DATA MUST BE POSITIVE FOR THIS PARM - CARD REJECTED
Meaning: Check the parameter code and the reading for consistency (see Appendix A, Table 5 for valid negative parameters).
Action: Correct and resubmit.

AEDMSTR 067 ABORT - NUMBER OF PARAMETER FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: The parameter file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the parameter file.

AEDMSTR 068 ABORT - PARM-CODE-KEY-ARRAY AREA OVERFLOW

Meaning: The parameter file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size

AEDMSTR 069 ABORT - NUMBER OF SITE FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: The site file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the site file.

AEDMSTR 070 ABORT - SITE-CODE-ARAY AREA OVERFLOW

Meaning: The site file contains more entries than allowed; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed size of the site file.

- AEMPARM -

AEMPARM 001 CONDITIONAL - NO OPTION CARD, DEFAULTS OF NOLIST, NOFLAGW USED

Meaning: There was no option card in the run stream.

Action: None, if the user intends for the default options to be used; otherwise, an option card should be included in the run stream and the job resubmitted.

AEMPARM 002 CONDITIONAL - INVALID FLAGW OPTION, DEFAULT OF NOFLAGW USED

Meaning: The value in the FLAGW field on the option card is neither FLAGW nor NOFLAGW.

Action: If the user wishes warning messages to be listed, he must insert the value FLAGW in the FLAGW field and resubmit the job.

AEMPARM 003 CONDITIONAL - INVALID LIST OPTION, DEFAULT OF NOLIST USED

Meaning: The value in the list field on the option card is neither LIST nor NOLIST.

Action: If the user wishes the input and output files to be listed, he must insert the value LIST in the list field and resubmit the job.

AEMPARM 004 ERROR - INVALID CARD TYPE; 1,2,3 ALLOWED; CARD REJECTED

Meaning: The card type field contains a value other than 1, 2, or 3.

Action: Correct the card type field and resubmit the transaction.

AEMPARM 005 ERROR - INVALID PARAMETER CODE, CARD REJECTED

Meaning: The parameter code is either non-numeric or equal to zero.

Action: Correct the parameter code field and resubmit the transaction.

AEMPARM 006 ERROR - INVALID METHOD CODE, CARD REJECTED

Meaning: The method code is either non-numeric or equal to zero.

Action: Correct the method code field and resubmit the transaction.

AEMPARM 007 ERROR - INVALID UNITS CODE, CARD REJECTED

Meaning: The units code is either non-numeric or equal to zero.

Action: Correct the units code field and resubmit the transaction.

AEMPARM 008 ERROR - INVALID ACTION CODE, CARD REJECTED

Meaning: The only valid action codes are A (add), C (change), and D (delete).

Action: Correct the action code field and resubmit the transaction.

AEMPARM 009 ERROR - INVALID MINIMUM DETECTABLE DECIMAL CODE, CARD REJECTED

Meaning: The only valid decimal codes are 0, 1, 2, 3, and 4.

Action: Correct the decimal position field and resubmit the transaction.

AEMPARM 010 ERROR - INVALID MINIMUM DETECTABLE, CARD REJECTED

Meaning: The minimum detectable value must be of the form 'dddd' for non-negative values or '-ddd' for negative values.

Action: Correct the minimum detectable field and resubmit the transaction.

AEMPARM 011 ERROR - NEG MIN DETECTABLE INVALID FOR THIS PARAMETER, CARD REJECTED

Meaning: The only parameters that allow negative minimum detectable values are: lapse rate (61202), temperature (62101); dew point (62103); temperature, 24-hour maximum (62104); temperature, 24-hour minimum (62105); temperature difference (62106).

Action: Correct the minimum detectable field and resubmit the transaction.

AEMPARM 012 ERROR - STANDARD UNITS MUST BE SPECIFIED, CARD REJECTED

Meaning: On an add transaction, both standard units fields should have non-blank values.

Action: Insert the proper values in the standard units code and standard units conversion factor fields. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently acceptable standard units codes and standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 013 ERROR - INVALID STANDARD UNITS CODE, CARD REJECTED

Meaning: The standard units code field contains a non-numeric or zero value.

Action: Insert the proper value in the standard units code field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently acceptable standard units codes. Resubmit the corrected transaction.

AEMPARM 014 ERROR - INVALID STANDARD UNITS CONVERSION FACTOR, CARD REJECTED

Meaning: The standard units conversion factor field contains a non-numeric value.

Action: Insert the proper value in the standard units conversion factor field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 015 ERROR - STANDARD UNITS CONVERSION FACTOR MUST BE NON-ZERO, CARD REJECTED

Meaning: The standard units conversion factor field contains a zero value.

Action: Insert the proper value in the standard units conversion factor field. Refer to the AEROS Manual Series, Volume V: AEROS Manual of Codes for a complete list of currently accepted standard units conversion factors. Resubmit the corrected transaction.

AEMPARM 016 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CODE, ASSUMING UNITS CODE IN KEY

Meaning: The user units fields in the add transaction were left blank; the program inserted into the user units code field the same value as the one in the units code field of the parameter key.

Action: None, if the user does not wish to specify additional units information in the user fields.

AEMPARM 017 ERROR - INVALID USER UNITS CODE, CARD REJECTED

Meaning: The user units code field contains a value that is non-numeric or zero.

Action: Correct the user units code field and resubmit the transaction.

AEMPARM 018 WARNING - ADD TRANSACTION DOES NOT SPECIFY USER UNITS CONV FAC, ASSUMING UNITY

Meaning: The user fields in the add transaction were left blank; the program inserted into the user units conversion factor field a value of 1.0 (see error message #16, above).

Action: None, if the user does not wish to specify additional units information in the user fields.

AEMPARM 019 ERROR - INVALID USER UNITS CONVERSION FACTOR, CARD REJECTED

Meaning: The user units conversion factor field contains a non-numeric value.

Action: Correct the user units conversion factor field and resubmit the transaction.

AEMPARM 020 ERROR - USER UNITS CONVERSION FACTOR MUST BE NON-ZERO, CARD REJECTED

Meaning: The user units conversion factor field contains a value of zero.

Action: Correct the user units conversion factor field and resubmit the transaction.

AEMPARM 021 ERROR - TRANSACTION IS DELETE AND NOT TYPE 1, CARD REJECTED

Meaning: A record is deleted only if a card type 1 delete transaction with the same parameter key is entered. No other card-type transaction will delete a record.

Action: If deletion of a record is intended, and there is no type 1 delete transaction for that parameter key in the input transactions, change the card type of this deletion to 1 and resubmit the transaction.

AEMPARM 022 ERROR - COLUMNS 11 THRU 79 OF DELETE CARD MUST BE BLANK, CARD REJECTED

Meaning: A delete transaction should have only the following fields coded: the card type field (value is 1), the parameter key fields, and the action code field (value is D).

Action: Correct the delete transaction and resubmit.

AEMPARM 023 ERROR - NO MATCH FOR TRANSACTION ON PARAMETER FILE, CARD REJECTED

Meaning: The transaction is a change or a delete transaction, but no matching parameter key can be found in the parameter file.

Action: Correct the parameter key of the transaction if a change or a delete is intended; otherwise, change the action code to A. Resubmit the transaction.

AEMPARM 024 ERROR - ADD TRANSACTION NOT ALLOWED FOR RECORD ON FILE, CARD REJECTED

Meaning: The transaction is an add transaction, but a record with the same key already exists in the file.

Action: Correct the parameter key if an add is intended; otherwise, convert the transaction to a change or delete transaction. Resubmit the transaction.

AEMPARM 025 ERROR - ADD TRANSACTION DOES NOT HAVE VALID 1, 2 AND 3 CARDS, CARD REJECTED

Meaning: A record cannot be added unless a full set of three valid transactions is present for it. Any otherwise valid add transactions in this incomplete set must be rejected since no parameter record can be created from them.

Action: Correct the given set of transactions to obtain three valid cards; resubmit these.

AEMPARM 026 ERROR - BLANK CARD, REJECTED

Meaning: A blank card was inserted in the transaction file.

Action: If the same transaction file is to be used again, remove the blank card.

AEMPARM 027 CONDITIONAL - NUMBER OF RECORDS IN OUTPUT PARAMETER FILE EXCEEDS 200

Meaning: Each AQDHS-II program (as released by NADB) that has a parameter-record storage table allows a maximum of 200 parameter records to be stored; a parameter file containing more than 200 records causes these programs to abort. AEMPARM (AQ0070) itself has no output file limit; it will generate as many output records as required by the interaction of the input parameter file and the input transactions.

Action: Either delete enough parameter records to make the file fall within the limit of 200 records, or increase the limit by making the appropriate changes in the affected AQDHS-II programs. See Section 4.2.2.8 for a list of these programs and Appendix C for instructions on modifying them.

AEMPARM 028 ABORT - INPUT TRANSACTION FILE OUT OF SEQUENCE

Meaning: The input transactions have not been previously sorted by the parameter transaction sort program, ASRPARM (AQ0150). Any output from this run is unuseable.

Action: Sort the transaction file and resubmit the job.

AEMPARM 029 DISASTER - OUTPUT PARAMETER FILE OUT OF SEQUENCE

Meaning: A program error has produced an output parameter file whose records are not in correct parameter-key sequence. Any output from this run is unuseable.

Action: Contact NADB.

-AEMSITE-

*** AEMSITE 001 ERROR - NO MATCHING KEY ON MASTER FILE - DELETE REQUEST IGNORED - CARD REJECTED

Meaning: A delete was specified for a non-existent record. The transaction was not processed.

Action: Check the transaction to insure that it contains the proper data. If the transaction does not contain the proper data, correct the error and resubmit the job.

*** AEMSITE 002 ERROR - COLUMN 01 - STATE CODE BLANK - TRANSACTION REJECTED

Meaning: There is no state code on the transaction card.

Action: Correct the error and resubmit the job.

*** AEMSITE 003 ERROR - COLUMN 13 - NON-NUMERIC AQCR - TRANSACTION REJECTED

Meaning: The AQCR field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 004 ERROR - COLUMN 16 - NON-NUMERIC COUNTY-CODE - TRANSACTION REJECTED

Meaning: The county field on the transaction card is not numeric.

Action: Correct the error and resubmit the job.

*** AEMSITE 005 ERROR - COLUMN 03 - NON-NUMERIC AREA CODE - TRANSACTION REJECTED

Meaning: The area field on the transaction card is not numeric.
Action: Correct the error and resubmit the job.

*** AEMSITE 006 ERROR - COLUMN 07 - NON-NUMERIC SITE CODE - TRANSACTION REJECTED

Meaning: The site field on the transaction card is not numeric.
Action: Correct the error and resubmit the job.

*** AEMSITE 007 ERROR - COLUMN 10 - NON-ALPHABETIC AGENCY CODE - TRANSACTION REJECTED

Meaning: The agency field on the transaction card is not alphabetic.
Action: Correct the error and resubmit the job.

*** AEMSITE 008 ERROR - COLUMN 11 - NON-NUMERIC PROJECT CODE - TRANSACTION REJECTED

Meaning: The project field on the transaction card is not numeric.
Action: Correct the error and resubmit the job.

-AEMSTND-

AEMSTND 001 ERROR - NON-NUMERIC PARAMETER CODE - TRANSACTION REJECTED

Meaning: The parameter code field columns 1-5 contains alphabetic characters.
Action: Correct the parameter code and resubmit the transaction.

AEMSTND 002 ERROR - INVALID FEDERAL OR STATE FLAG

Meaning: An illegal character has been found in the standard type field (column 6).

Action: Correct the standard type (F for federal or S for state standard) and resubmit the transaction.

AEMSTND 003 ERROR - NON-NUMERIC STANDARD NUMBER CODE

Meaning: Alphabetic characters have been found in the standard number field (columns 7-8).

Action: Correct the standard number and resubmit the transaction.

AEMSTND 004 ERROR - INVALID PRIMARY/SECONDARY CODE

Meaning: An illegal character has been found in the standard flag field (column 9).

Action: Correct the standard flag (1 for primary or 2 for secondary) and resubmit the transaction.

AEMSTND 005 ERROR - NON-NUMERIC UNITS-CODE

Meaning: An alphabetic character has been found in the units code field (columns 10-11).

Action: Correct the units code and resubmit the transaction.

AEMSTND 006 ERROR - NO MATCHING KEY ON MASTER FILE - DELETE REQUEST IGNORED - SET REJECTED

Meaning: No record in the input parameter standards file has the same key information as the indicated transaction; therefore, no record can be deleted.

Action: Correct the key information on the indicated transaction if "replace" or "add" action is intended rather than "delete", columns 12-61 (standard description) should not be blank. Resubmit the transaction.

- AFMMSTR -

AFMMSTR 001 ERROR - READING xx - ATTEMPT TO ADD DATA TO EXISTING READING - DATA REJECTED

Meaning: The specified master file record already contained a reading in the position indicated for adding reading xx. Reading xx was, therefore, rejected.

Action: Correct and resubmit.

AFMMSTR 002 WARNING - READING xx - VALUE NOT SPECIFIED - FILLED WITH NINES (yyyyyyyyyyyyy-yyyyyyyy-yyyyyyyyy)

Meaning: No value was specified for reading xx in the record with key yyyyyyyyyyyyy-yyyyyyyy-yyyyyyyyy. Since subsequent readings were specified for this record, this reading is set to the null value (9999) as a place-holder.

Action: None.

AFMMSTR 003 ERROR - NO MATCHING KEY FOUND ON MASTER FILE - TRANSACTION REJECTED

Meaning: There is no corresponding record in the master file for this transaction.

Action: Correct and resubmit.

AFMMSTR 004 ERROR - READING xx - ATTEMPT TO CHANGE NON-EXISTING READING - DATA REJECTED

Meaning: A change transaction was submitted for a non-existent or null reading in the specified master file record. The reading was, therefore, rejected.

Action: Correct and resubmit.

AFMMSTR 005 - CONDITIONAL - MISSING OR INVALID OPTION CARD - DEFAULT OPTIONS

(NOLIST NOFLAGW) USED

Meaning: An invalid option was specified, or no option card submitted. The program was executed using the default options NOLIST and NOFLAGW.

Action: None.

AFMMSTR 006 ABORT - TRANSACTION FILE IS NOT IN PROPER SORT SEQUENCE

Meaning: The input file of internal transactions has not been sorted and, therefore, the run was terminated. Do not use the output from this run.

Action: Sort the internal transactions using the master file internal transaction sort program ASRINTR (AQ0130).

AFMMSTR 007 DISASTER - DUPLICATE RECORD IN OLD MASTER FILE
MASTER FILE RECORD KEY 1 = XXX
MASTER FILE RECORD KEY 2 = XXX
TRANSACTION RECORD KEY = XXX

Meaning: Two master file records with the same key were found and, therefore, the run was terminated. Do not use the output from this run.

Action: Call NADB.

AFMMSTR 008 ABORT - MASTER FILE IS OUT OF SEQUENCE
MASTER FILE RECORD KEY 1 = XXX
MASTER FILE RECORD KEY 2 = XXX
TRANSACTION RECORD KEY = XXX

Meaning: An out-of-sequence master file record was found and, therefore, the run was terminated. Do not use the output from this run.

Action: Determine if the input master file has been sorted by the master file sort program ASRMSTR (AQ0140). If it has been, re-execute AFMMSTR (AQ0100) using the correct master file (i.e., a master file that has not been sorted by ASRMSTR (AQ0140)). If the correct master file was used, there is a serious problem with that master file, and the user should contact NADB.

AFMMSTR 009 DISASTER - NEW MASTER FILE WILL BE OUT OF SEQUENCE
MASTER FILE RECORD KEY 1 = XXX
MASTER FILE RECORD KEY 2 = XXX
TRANSACTION RECORD KEY = XXX

Meaning: AFMMSTR (AQ0100) attempted to create a new master file record with a key less than or equal to that of the last master file record written and, therefore, the run was terminated. Do not use the output from this run.

Action: Call NADB.

-AMSARCH-

*** AMSARCH 001 ABORT - INVALID YEAR SPECIFIED

Meaning: Either no option card is present, or the specified option date is not numeric or not greater than 59. Therefore, the run was terminated.

Action: Correct the error and resubmit the job.

-AMSMERG-

AMSMERG 001 ABORT - IDENT KEY='identification key' IS FOUND ON BOTH FILES

Meaning: Records with identical keys were found in both files and program execution was terminated.

Action: Delete the undesired duplicate record from one of the input files and resubmit the job.

AMSMERG 002 ABORT - FILE #1 OUT OF SEQUENCE

Meaning: Input file #1 is out of sequence or contains records with duplicate keys. Therefore, program execution was terminated.

Action: Sort input file #1 into the proper sequence using program ASRMSTR (AQ0140). Verify that there are no records with duplicate keys in the file. If there are, correct the error and resubmit the job.

AMSMERG 003 ABORT - FILE #2 OUT OF SEQUENCE

Meaning: Input file #2 is out of sequence or contains records with duplicate keys. Therefore, program execution was terminated.

Action: Sort input file #2 into the proper sequence using program ASRMSTR (AQ0140). Verify that there are no records with duplicate keys in the file. If there are, correct the error and resubmit the job.

- ARPANOM -

ARPANOM 001 DISASTER - INVALID OR MISSING HEADER RECORDS ON INPUT FILE

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has invalid or missing header records.

Action: Call NADB.

ARPANOM 002 ABORT - INVALID OPTION

Meaning: The option card read by ACVANOM (AQ0040) was invalid.

Action: Correct or delete the option card and re-execute ACVANOM (AQ0040) and ARPANOM (AQ0320).

ARPANOM 003 DISASTER - INPUT FILE CONTAINS DATA NOT TO BE SCREENED

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) contains data which does not fall into one of the categories in Figure 6.4.3-a.

Action: Call NADB.

ARPANOM 004 ABORT - INVALID STATE CODE (XXXXXXXXXXXXX-YYYYYY-ZZZZZZZZZ).

Meaning: A master file record has an invalid state code. (Note: this error can only occur when screening readings for sulfur dioxide.) XXXXXXXXXXXXX is the state-area-site-agency-project-time codes, YYYYYY is the year-month-day, and ZZZZZZZZZ is the parameter-method-unit codes of the record causing the error.

Action: Correct the master file using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). Re-execute ACVANOM (AQ0040) and ARPANOM (AQ0320).

ARPANOM 005 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 006 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 007 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

ARPANOM 008 DISASTER - INPUT FILE IS INVALID

Meaning: The file passed from ACVANOM (AQ0040) to ARPANOM (AQ0320) has out-of-sequence or missing records.

Action: Call NADB.

- ARPINV -

ARPINVP 001 ABORT - POLLUTANT TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II parameter file exceeds the limit of 200 imposed by the parameter code table in the program; therefore, the run was terminated.

Action: Either decrease the size of the input parameter file or increase the size of the parameter code table in the program (see Appendix C: Program Modification).

ARPINVP 002 ABORT - SITE TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II site file exceeds the limit of 200 imposed by the site code table in the program; therefore, the run was terminated.

Action: Either decrease the size of the input site file or increase the size of the site code table in the program (see Appendix C: Program Modification).

ARPINVP 003 ABORT - LEVEL 77 DATA FIELD "PARM-MAX" INCREASED BEYOND PARM-TABLE SIZE

Meaning: In an attempt to increase the size of the parameter table in the program, the user has changed only one of the two pertinent lines of code; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the parameter table.

ARPINVP 004 ABORT - LEVEL 77 DATA FIELD "SITE-MAX" INCREASED BEYOND SITE-TABLE SIZE

Meaning: In an attempt to increase the size of the site table in the program, the user has changed only one of the two pertinent lines of code; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the site table.

- A R P I N V S -

ARPINVS 001 ABORT - SITE FILE OVERFLOW: NUMBER OF SITE FILE RECORDS EXCEEDS PROGRAM STORAGE SPACE

Meaning: There are more records in the site file than the table (defined in the program) can accommodate; therefore, the run was terminated.

Action: Increase the size of the table in the program accordingly. Refer to Appendix C for instructions on changing the size of the table.

ARPINVS 002 ABORT - PARAMETER FILE OVERFLOW: NUMBER OF PARAMETER FILE RECORDS EXCEEDS PROGRAM STORAGE SPACE

Meaning: There are more records in the parameter file than the table (defined in the program) can accommodate; therefore, the run was terminated.

Action: Increase the size of the table in the program accordingly. Refer to Appendix C for instructions on changing the size of the table.

ARPINVS 003 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARM-TABLE SIZE

Meaning: The 77-level data item "NBR-OF-PARMS" does not coincide with the size of the parameter table defined in the program; therefore, the run was terminated.

Action: Refer to Appendix C for instructions on changing the 77-level data item.

ARPINVS 004 ABORT - LEVEL 77 DATA FIELD "NBR-OF-SITES" INCREASED BEYOND SITE-TABLE SIZE

Meaning: The 77-level data item "NBR-OF-SITES" does not coincide with the size of the site code table defined in the program; therefore, the run was terminated.

Action: Refer to Appendix C for instructions on changing the 77-level data item.

- ARPMSST -

ARPMSST 001 ABORT - SITE TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II site file exceeds the limit imposed by the site table in the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 002 ABORT - PARM TABLE OVERFLOW

Meaning: The number of records in the AQDHS-II parameter file exceeds the limit imposed by the parameter table in the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 003 ABORT - STATISTICS FILE EMPTY

Meaning: There are no records in the input statistics file; therefore, no report can be generated.

Action: The problem probably lies with the master or answer file that was input to ASTPRLM (AQ0190). If this file contains no data, a valid master or answer file must be chosen and the four programs - ASRMSTR (AQ0140), ASTPRLM (AQ0190), ASTMSST (AQ0200), and ARPMSST (AQ0270) - rerun.

ARPMSST 004 WARNING - OPTION CARD MISSING: DEFAULT VALUES ARE 64 LINES PER PAGE AND FULL SITE BREAK

Meaning: Because no option card was present in the job stream, the default options were used to generate the statistics report.

Action: None, if the user is satisfied with the format of the report.

ARPMSST 005 WARNING - COLUMN 1 - INVALID OR MISSING SITE BREAK OPTION - FULL BREAK OPTION USED

Meaning: The page-break field on the option card either was left blank or contained a character string other than BRIEF or FULL. The report was generated using the FULL option.

Action: If the BRIEF option is desired, correct the option card and rerun the statistical analysis job stream.

ARPMSST 006 WARNING - COLUMN 7 - INVALID OR MISSING LINE MAXIMUM OPTION - 64 LINES PER PAGE USED

Meaning: The line-maximum field on the option card was either left blank or contained non-numeric characters. The report was generated with a maximum of 64 lines per page.

Action: If a line maximum other than 64 is desired, correct the option card by inserting the desired maximum value in columns seven and eight and rerun the statistical analysis job stream.

ARPMSST 007 ABORT - LEVEL 77 DATA FIELD "SITE-MAX" INCREASED BEYOND SITE-TABLE SIZE

Meaning: A user modification was made to ARPMSST (AQ0270) to change the capacity of the site table. However, only one of the two required line changes was made. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

ARPMSST 008 ABORT - LEVEL 77 DATA FIELD "PARM-MAX" INCREASED BEYOND PARM-TABLE SIZE

Meaning: A user modification was made to ARPMSST (AQ0270) to change the capacity of the parameter table. However, only one of the two required line changes was made. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the table size; then rerun the statistical analysis job stream.

- ARPMSTR -

ARPMSTR 001 ABORT - ANSWER FILE CONTAINS NO DATA

Meaning: There were no records in the input AQDHS-II master (or answer) file. It is possible that the retrieval request was overly restrictive and no records qualified. Another possibility is that the wrong file name was used in the JCL. In either case, the run was terminated and no report was produced.

Action: Examine the file names in the JCL and any retrieval specifications used; correct as necessary and resubmit the job.

ARPMSTR 002 ABORT - IDENTIFIER NOT RECOGNIZED

Meaning: The correct options were not used on the option card; the valid identifiers are DISPLAY, MEAN, and SUM. The run was terminated and no report was produced.

Action: Correct the option card and resubmit the job.

ARPMSTR 003 CONDITIONAL - OPTION CARD MISSING FOR STD ANSWER FILE - ASSUME MEAN REPORT

Meaning: No option card defining the summary type was specified. The default of MEAN was used for the report.

Action: No action is necessary, unless the SUM option is desired. If so, enter SUM on the option card and resubmit the job.

ARPMSTR 004 ABORT - SYNTAX REQUIRES RELATIONAL OP (<,=,>)

Meaning: The relational operator for the display statement is missing, improperly coded, or out of sequence on the option card. The run was terminated and no report was produced.

Action: Check the display statement for correct format and syntax. Correct the error and resubmit the job.

ARPMSTR 005 ABORT - INVALID USE OF DISPLAY STMT WITH NULL READING

Meaning: The display statement logic would have caused all valid readings to be suppressed. (An example of an invalid statement is DISPLAY N < 9999.) The run was terminated and no report was produced.

Action: Correct the display statement and resubmit the job.

ARPMSTR 006 ABORT - PARM TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input parameter file exceeds the limit of 200 imposed by the parameter table size in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 007 ABORT - SYNTAX REQUIRES NEGATIVE SYMBOL (N) OR RELATIONAL OP (<,=,>)

Meaning: Something other than the negation operator (N) or the relational operator (<,=,>) precedes the specified numeric value in the display statement. Therefore, the run was terminated.

Action: Check the display statement for correct format and syntax. Correct the error and resubmit the job.

ARPMSTR 008 ABORT - SYNTAX ERROR ON OPTION CARD

Meaning: The option card contains one or more invalid words; the only valid words are DISPLAY, SUM, and MEAN. Therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

ARPMSTR 009 ABORT - DISPLAY STMT PARAMETER NOT NUMERIC

Meaning: The threshold value used in the display statement on the option card is not a number in the range of -999 to 9997; therefore, the run was terminated.

Action: Correct the display threshold value and resubmit the job.

ARPMSTR 010 ABORT - MEAN STMT MAY NOT BE USED WITH SLIDING AVG INPUT

Meaning: The summary option is not allowed for a sliding average report; therefore, the run was terminated and no report was produced.

Action: Delete MEAN from the option card or if a sliding average file was not the expected input, check the JCL to insure that the specified master file name is correct. Resubmit the job.

ARPMSTR 011 ABORT - SUM STMT MAY NOT BE USED WITH SLIDING AVG INPUT

Meaning: The summary option is not allowed for a sliding average report; substituted; however, the output report is useable.

Action: Save the input files, the run stream, the compile of ARPMSTR, and the output and contact the National Air Data Branch for assistance.

ARPMSTR 013 ABORT - OUTPUT FILE CONTAINS NO DATA

Meaning: The input file contained no records and no report was printed. One possible cause could be that the name of the master file in the JCL is incorrect. Another possible cause is that, if the report follows a retrieval, the retrieval specifications were too restrictive and no records were selected.

Action: Verify that the JCL names and/or the retrieval specifications are correct; if errors are found, correct them and resubmit the job.

ARPMSTR 014 ABORT - SITE TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input site file exceeds the limit of 200 imposed by the site table in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 015 ABORT - STANDARDS TABLE OVERFLOW CONSULT USER GUIDE FOR CORRECTIVE ACTION

Meaning: The number of records in the input standards file exceeds the limit of 200 imposed by the parameter standards table in the program. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the allowed table size.

ARPMSTR 016 ABORT - MEAN AND SUM ARE MUTUALLY EXCLUSIVE OPTIONS

Meaning: Both MEAN and SUM are values for the summary option and both cannot be selected for a given run; therefore, the run was terminated.

Action: Select the option desired, delete the other word from the option card, and resubmit the job.

ARPMSTR 017 ABORT - LEVEL 77 DATA FIELD "NBR OF PARMS" INCREASED BEYOND PARM-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ARPMSTR 018 ABORT - LEVEL 77 DATA FIELD "NBR-OF-SITES" INCREASED BEYOND SITE-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

ARPMSTR 019 ABORT - LEVEL 77 DATA FIELD "NBR-OF-STANDARDS" INCREASED BEYOND STANDARD-TABLE SIZE

Meaning: ARPMSTR (AQ0230) has been incorrectly modified to increase the parameter standards table; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the allowed table size.

- ARPPMEX -

ARPPMEX 001 ABORT - LEVEL 77 DATA FIELD "NBR-OF-PARMS" INCREASED BEYOND PARAMETER-TABLE SIZE

Meaning: The level 77 data field 'NBR-OF-PARMS' has been increased without increasing the size of the parameter table.

Action: See Appendix C for instructions on correctly increasing the size of the parameter table.

ARPPMEX 002 ABORT - PARMAMETER-TABLE AREA OVERFLOW

Meaning: Either the number of parameter file records exceeds the program's storage space as defined in the parameter table, or the size of the parameter table has been increased without increasing the value of the level 77 data field 'NBR-OF-PARMS'.

Action: See Appendix C for instructions on correctly making the necessary changes.

ARPPMEX 003 ABORT - EXCEPTION-PARAMETER-TABLE AREA OVERFLOW

Meaning: Either the number of new parameter, method, and unit code combinations exceeds the program's storage space as defined in the exception parameter table, or the size of the exception parameter table has been increased without increasing the value of the level 77 data field 'NBR-OF-EXCP'.

Action: See Appendix C for instructions on correctly making the necessary changes.

ARPPMEX 004 ABORT - LEVEL 77 DATA FIELD "NBR-OF-EXCP" INCREASED BEYOND EXCEPTION-PARAMETER-TABLE SIZE

Meaning: The level 77 data field 'NBR-OF-EXCP' has been increased without increasing the size of the exception parameter table.

Action: See Appendix C for instructions on correctly increasing the size of the exception parameter table.

- ARPSMEX -

ARPSMEX 001 CONDITIONAL - INVALID OPTION CARD - DEFAULT OPTION (62 LINES PER PAGE) ASSUMED.

Meaning: Either a non-numeric character or an integer less than 20 was specified in columns one through two of the option card. The default of 62 lines per page was assumed.

Action: None.

ARPSMEX 002 ABORT - EMPTY SITE FILE

Meaning: The input site file contains no records; therefore, the run was terminated.

Action: Specify a valid site file and resubmit the run.

ARPSMEX 003 ABORT - SITE FILE OVERFLOW

Meaning: The site file contains more records than the maximum allowed by the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size allowed for the site file.

ARPSMEX 004 ABORT - EMPTY MASTER FILE

Meaning: The input master file contains no records; therefore, the run was terminated.

Action: Specify a valid master file and resubmit the run.

ARPSMEX 005 ABORT - 'MISSING-SITE' TABLE OVERFLOW

Meaning: The number of missing sites exceeds the maximum allowed by the program; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size allowed for the site file.

ARPSMEX 006 ABORT - LEVEL 77 DATA FIELD 'NBR-OF-SITES' INCREASED BEYOND SITE-TABLE SIZE

Meaning: The limit for the number of records in the site file has been increased, but the working-storage allocation for the site table has not been increased correspondingly. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the site table.

ARPSMEX 007 ABORT - LEVEL 77 DATA FIELD 'MISSING-SITE-MAX' INCREASED BEYOND MISSING-SITE-TABLE SIZE

Meaning: The limit for the number of missing sites has been increased, but the working-storage allocation for the missing-site table has not been increased correspondingly. Therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the missing-site table.

- ARTGENR -

ARTGENR 001 ABORT - MASTER FILE CONTAINS NO RECORDS

Meaning: The input master file as specified in the user-supplied JCL contains no records; therefore, the run was terminated.

Action: Correct the file name and resubmit the job.

ARTGENR 002 CONDITIONAL - ANSWER FILE CONTAINS NO RECORDS

Meaning: No records were found fitting the criteria specified in the retrieval statements.

Action: Check the retrieval statements for accuracy if some records should have been retrieved. Correct any errors and resubmit the job.

- ARTLNGP --

ARTLNGP 001 CONDITIONAL - $$END CARD MISSING

Meaning: The last card for the retrieval specifications must be a $$END. If this card is missing, the error message will be printed, but program execution will continue.

Action: No action required unless other errors have been detected.

ARTLNGP 002 ABORT - FIRST CONTROL CARD NOT $$SELECT

Meaning: The first control card for specifying a retrieval must be a $$SELECT card. If this card is not present, the run is aborted.

Action: Include the $$SELECT card and resubmit the job.

ARTLNGP 003 ABORT - DATA NAME INVALID 'identifier'

Meaning: Subject and object names (identifiers) must be spelled exactly, including the hyphen, as spelled in the valid retrieval data names, Figure 5.2.2-c. The program execution was prematurely terminated.

Action: Correct the subject or object name (indicated by the identifier in the error message) and resubmit the job.

ARTLNGP 004 ABORT - NO CONTROL CARDS IN INPUT STREAM

Meaning: There must be at least a $$SELECT and a $$END card in the input run stream. The run was aborted.

Action: Include control cards as shown in 5.2.2.5.4 and resubmit the job.

ARTLNGP 005 ABORT - INVALID NEGATION CHARACTER

Meaning: The character N should be used as the negation flag; otherwise, the negation flag field should be blank. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 006 ABORT - INVALID RELATIONAL OPERATOR

Meaning: The only valid relational operators are = denoting equal to, > denoting greater than, and < denoting less than; any other symbol will be rejected. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 007 ABORT - INVALID BOOLEAN OPERATOR

Meaning: The valid Boolean operators are AND and OR. The run was aborted.

Action: Correct the error and resubmit the job.

ARTLNGP 008 ABORT - $$SELECT OR $$END CARD EXPECTED BUT NOT FOUND

Meaning: An AQDHS-II retrieval language card with no Boolean operator was followed by another retrieval language card. Since only the last card in a retrieval may have no Boolean operator, the run was aborted.

Action: Correct the retrieval and resubmit the job.

ARTLNGP 009 ABORT - RETRIEVAL LANGUAGE CARD EXPECTED BUT NOT FOUND

Meaning: The last AQDHS-II retrieval language card in a retrieval had a Boolean operator with no matching relationship. The last retrieval language card in a retrieval must not contain a Boolean operator; therefore, the run was aborted.

Action: Correct the retrieval and resubmit the job.

ARTLNGP 010 ABORT - NUMBER OF RETRIEVALS EXCEEDS BATCH LIMIT

Meaning: More than twenty retrievals have been batched in one run; therefore, the run was aborted.

Action: Resubmit the job with no more than twenty retrievals batched in one run.

ARTLNGP 011 ERROR - ALL STATEMENTS AFTER $$END CARD ARE IGNORED

Meaning: Cards have been found after the $$END card; these are ignored.

Action: None, if the cards after the $$END card can be ignored with no significant change in the result of the retrieval; otherwise, correct the retrieval and resubmit.

ARTLNGP 012 ABORT - MORE THAN ONE RETRIEVAL IN USER-WRITTEN COBOL RUN

Meaning: With the USER option specifying COBOL language statements, only one retrieval ($$SELECT card) is allowed per run. The run was aborted.

Action: Delete the additional retrievals and resubmit the job.

ARTLNGP 013 ABORT - MORE THAN ONE RETRIEVAL IN SLIDING AVERAGE RUN

Meaning: The SLIDING option on the first $$SELECT card will allow only one retrival to be processed. The run was aborted.

Action: Delete the additional retrievals and resubmit the job.

ARTLNGP 014 ABORT - ONLY THE FIRST $$SELECT CARD CAN SPECIFY OPTIONS

Meaning: Only the first $$SELECT card can specify options. Columns nine through 72 of all subsequent $$SELECT cards must be blank; therefore, the run was aborted.

Action: Correct the retrieval and resubmit the job.

ARTLNGP 015 CONDITIONAL - INVALID PROGRAM NAME, USING ARTDFLT

Meaning: The name of the generated load module on the $$SELECT card be seven characters or less; the first character must be alphabetic, and the remaining characters must be alphabetic or numeric. No spaces are allowed. If the name is found to be invalid, the name 'ARTDFLT' is used.

Action: No action is needed if the program name ARTDFLT is acceptable.

ARTLNGP 016 ABORT - INVALID $$SELECT CARD

Meaning: Invalid options appear on the $$SELECT card or an invalid combination of options appear on the $$SELECT card. The run was aborted.

Action: Refer to Figures 5.2.2-a, 5.2.2-b, and 5.2.2-j for valid options and combinations of options. Correct the $$SELECT card and resubmit the run.

- ASRMSTR -

ASRMSTR 001 ABORT - INVALID OPTION SPECIFIED

Meaning: Either an invalid option word is contained in columns 1 through 5 or 7 through 10 of the option card, or both fields are blank. Therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

- ASTMSST -

ASTMSST 001 DISASTER - NO HEADER RECORD ON INPUT STATISTICS FILE

Meaning: The preliminary statistics file has no header record; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 002 DISASTER - NO HEADER RECORD ON INPUT DATA FILE

Meaning: The raw data file has no header record; therefore the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 003 ABORT - NO DATA ON INPUT STATISTICS FILE

Meaning: The preliminary statistics file contains only a header record and a trailer record, therefore, the run was terminated.

Action: Insure that the correct AQDHS-II master or answer file was input to ASTPRLM (AQ0190); rerun ASTPRLM (AQ0190).

ASTMSST 004 ABORT - NO DATA ON INPUT DATA FILE

Meaning: The raw data file contains only a header record and a trailer record; therefore, the run was terminated.

Action: Insure that the correct AQDHS-II master or answer file was input to ASTPRLM (AQ0190); rerun ASTPRLM (AQ0190).

ASTMSST 005 DISASTER - INPUT STATISTICS AND DATA FILES DO NOT CORRESPOND

Meaning: The key information on the preliminary statistics and raw data files do not match; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 006 DISASTER - INVALID AVERAGE DEC PT IND, KEY INFO IS XXXXXXXXXXXXXXXXXXXXXX-YYYYYYY

Meaning: The preliminary statistics file contains an invalid average decimal point indicator; therefore, the run was terminated. XXXXXXXXXXXXXXXXXXXX is the state, AQCR, county, area, site, agency, project, and time code key and YYYYYYYYY is the parameter, method, and units code key of the erroneous record.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 007 DISASTER - INPUT STATISTICS FILE TERMINATED BEFORE INPUT DATA FILE

Meaning: The preliminary statistics file terminated before the raw data file; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

ASTMSST 008 DISASTER - INPUT DATA FILE TERMINATED BEFORE INPUT STATISTICS FILE

Meaning: The raw data file terminated before the preliminary statistics file; therefore, the run was terminated.

Action: Contact personnel at the National Air Data Branch for further assistance.

- ASTPRLM -

ASTPRLM 001 ABORT - NO INPUT RECORDS

Meaning: The input master or answer file contains no records; therefore, the run was terminated.

Action: Verify that the correct file was input.

ASTPRLM 002 ABORT - INVALID OPTION CARD

Meaning: The option card is invalid; therefore, the run was terminated.

Action: Correct the option card and resubmit.

ASTPRLM 003 ABORT - NUMBER OF PARM FILE RECORDS EXCEEDS MAXIMUM ALLOWED

Meaning: ASTPRLM (AQ0190) has been incorrectly modified: the maximum number of parameters specified in the program is larger than the size of the parameter array; therefore, the run was terminated.

Action: See Appendix C for instructions on correctly increasing the size of the array.

ASTPRLM 004 ABORT - PARM ARRAY OVERFLOW

Meaning: The input parameter file contains more records than can be stored in the parameter array; therefore, the run was terminated.

Action: See Appendix C for instructions on increasing the size of the array.

ASTPRLM 005 ABORT - NO MATCH FOUND ON PARAMETER FILE FOR PARAMETER KEY xxxxxxxxx

Meaning: A parameter key of xxxxxxxxx was found in the input master or answer file, but no matching parameter key was found in the parameter file; therefore, the run was terminated.

Action: Determine which file is in error. The parameter file can be corrected using ASRPARM (AQ0150) and AEMPARM (AQ0070). The master file can be corrected using AEDMSTR (AQ0060), ASRINTR (AQ0130), and AFMMSTR (AQ0100). Resubmit after the incorrect file has been corrected.

ASTPRLM 006 ABORT - INVALID TIME CODE ENCOUNTERED (xxxxxxxxxxxxxxxxxxxxxxxxxx)

Meaning: An invalid time code was found in the input master or answer file. xxxxxxxxxxxxxxxxxxxxxxxxxx is the state-AQCR-county-area-site-agency-project-time-year-parameter-method-units codes key. Therefore, the run was terminated.

Action: Correct the master or answer file using AEDMSTR (AQ0070), ASRINTR (AQ0130), and AFMMSTR (AQ0100) and resubmit.

ASTPRLM 007 CONDITIONAL - x,xxx,xxx MASTER FILE RECORDS WITH QUARTERLY DATA WERE BYPASSED

Meaning: This message is printed only when the MONTH option is in effect. It informs the user of the number of master file records that contained quarterly data and were therefore bypassed.

Action: None

- ASTSLAV -

ASTSLAV 001 ABORT - ANSWER FILE IS NOT A SLIDING AVERAGE FILE

Meaning: ASTSLAV (AQ0180) can only process a sliding average answer file produced by a SLIDING mode retrieval procedure (see Section 5.2.2.2). Therefore, the run was terminated.

Action: Insure that the input file has been created by the retrieval procedure using the SLIDING option on the $$SELECT card and resubmit the job.

ASTSLAV 002 ABORT - CONTROL CARD MISSING

Meaning: The option card must be included to specify the interval size. The run was terminated.

Action: Input the option card and resubmit the job.

ASTSLAV 003 ABORT - NON-NUMERIC INTERVAL ON CONTROL CARD

Meaning: The interval specified on the option card must be numeric, and must be between the values 2 and 31, inclusive. The run was terminated.

Action: Correct the control card and resubmit the job.

ASTSLAV 004 ABORT - INTERVAL SPECIFIED LESS THAN 2 OR GREATER THAN 31

Meaning: The interval specified on the option card must not be less than 2 or greater than 31. The run was terminated.

Action: Correct the option card and resubmit the job.

ASTSLAV 005 ABORT - SLIDING AVERAGE RECORD REQUIRED

Meaning: The program has found an input record that is not a sliding average record. This can happen if a standard answer file has been concatenated to a sliding average answer file. The run was terminated.

Action: Insure that the input file contains only sliding average file records and resubmit the job.

ASTSLAV 006 ABORT - SLIDING AVERAGE ANSWER FILE CONTAINS NO DATA

Meaning: There were no records in the input file; therefore, the run was terminated. This could have happened because the retrieval specifications were too restrictive and no records were selected; also, the retrieval may have been terminated prior to writing the answer file, or because of an error in the retrieval procedure.

Action: Examine the retrieval specifications and resubmit both the retrieval and sliding average procedures.

ASTSLAV 007 ABORT - SLIDING AVERAGE STATEMENT INVALID OR MISSING

Meaning: The statement identifier AVERAGE is misspelled or missing; therefore, the run was terminated.

Action: Correct the control card and resubmit the job.

ASTSLAV 008 ABORT - SYNTAX REQUIRES NUMERIC PARAMETER BETWEEN 2 AND 31

Meaning: An invalid interval was specified; therefore, the run was terminated.

Action: Correct the option card and resubmit the job.

ASTSLAV 009 CONDITIONAL - INTERVAL SPECIFIED EXCEEDS MAX READINGS - SKIPPING TO NEXT SAMPLE

Meaning: The interval specified exceeds the maximum allowed for the time code. No sliding average values are computed until a record is encountered which has a different Key 1/Key 2 combination. See Figure 5.3.4-f for allowed interval sizes by time code.

Action: If a sliding average is required for the record in question, a smaller interval must be specified. For a small answer file, the option card should be changed and the job rerun. For a large answer file, rerun the retrieval, selecting only the skipped records, and then run the sliding average program (with the changed option card) on that answer file.

ASTSLAV 010 CONDITIONAL - OPTION FOR NUMBER OF READINGS REQUIRED INVALID - 50% USED

Meaning: An invalid value has been specified for the required number of readings; therefore, ASTSLAV (AQ0180) was executed using the default value A.

Action: No action is needed unless the SAROAD value of 75% is required; if so, correct the option card and resubmit the job.

APPENDIX C - PROGRAM TABLE MODIFICATION

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C.1 INTRODUCTION

Many of the AQDHS-II programs utilize auxiliary files (e.g., parameter, site, and parameter standards files) by reading the records from the files and storing them in tables. The size of a table is determined by the numeric value assigned to appropriate data items in the program: a 77-level entry and one or two record-level entries. As released by EPA-NADB, these data items are set at 200; i.e., the program can process an auxiliary file containing 200 or less records.

If a user has an auxiliary file which has more than 200 records, he must modify all programs which store that file in a table; i.e., he must increase the numeric value of the appropriate data items in the programs. This appendix provides precise instructions for making the correct changes. These instructions should be followed exactly. If a program is incorrectly modified, it will abort and an AQDHS-II error message will be printed to indicate the faulty modification.

C.2 SPECIAL INSTRUCTIONS

When any modification has been made to any program, the modified program must be compiled and link edited successfully before use. This step is mandatory.

The region size allocated for executing a program may be affected when the size of a table in that program has been increased. The region size is a substitutable parameter in most of the cataloged procedures, and is, therefore, easily changed.

The size of a table in a program for a particular auxiliary file should coincide with the size of all other tables for that file in all other programs. Therefore, when changing the size of a table in one program, the user should change the size of the analogous tables in other programs accordingly.

In the following examples, all tables are modified to accommodate 300 records. The user may, of course, choose a value other than 300 to satisfy his own requirements.

C.3 CHANGING THE SITE TABLE SIZE

Whenever it is necessary to change the size (number of entries) of the site table, all programs listed in this section must be modified accordingly. The user must complete all changes listed for a given program unless otherwise specified. The user should also refer to the special instructions at the beginning of this Appendix when modifying programs.

AEDMSTR (AQ0060) - MASTER FILE TRANSACTION EDIT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00038600) from:

```
     77  NBR-OF-SITES          PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  NBR-OR-SITES          PIC 999 COMP SYNC VALUE 300.
```

2. Change the OCCURS clause of the following program statement (on or about sequence number 00145900) from:

```
     03  SITE-CODE-TABLE       OCCURS 200 TIMES.
```

   to:

```
     03  SITE-CODE-TABLE       OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

AEMSITE (AQ0080) - SITE FILE MAINTENANCE PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00012900) from:

```
     77  NBR-OF-SITES          PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  NBR-OF-SITES          PIC 999 COMP SYNC VALUE 300.
```

   If the number of output site file records exceeds the value of this data item, a warning message will be generated. After receiving this warning message, the user should make the necessary changes to other programs that access the AQDHS-II site file.

ARPINVP (AQ0290) - INVENTORY BY POLLUTANT REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00012300) from:

```
     77  SITE-MAX                  PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  SITE-MAX                  PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00017900) from:

```
     02  SITE-BLOCK                PIC X(9200) VALUE SPACES.
```

   to:

```
     02  SITE-BLOCK                PIC X(13800) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 46 characters).

   The numeric value specified in this PIC clause must be 46 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00018000) from:

```
     02  SITE-RECORD REDEFINES SITE-BLOCK OCCURS 200 TIMES.
```

   to:

```
     02  SITE-RECORD REDEFINES SITE-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPINVS (AQ0280) - INVENTORY BY SITE REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00013400) from:

```
     77  NBR-OF-SITES            PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  NBR-OF-SITES            PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00037800) from:

```
     02  SITE-BLOCK PIC X(9800) VALUE SPACES.
```

   to:

```
     02  SITE-BLOCK PIC X(14700) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 49 characters). The numeric value specified for this PIC clause must be 49 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00037900) from:

```
     02  SITE-CODE-TABLE REDEFINES SITE-BLOCK OCCURS 200 TIMES.
```

   to:

```
     02  SITE-CODE-TABLE REDEFINES SITE-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPMSST (AQ0270) - STATISTICAL REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00019300) from:

   ```
   77  SITE-MAX                PIC 999 COMP SYNC VALUE 200.
   ```

   to:

   ```
   77  SITE-MAX                PIC 999 COMP SYNC VALUE 300.
   ```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00047200) from:

   ```
   02  SITE-BLOCK              PIC X(14400) VALUE SPACES.
   ```

   to:

   ```
   02  SITE-BLOCK              PIC X(21600) VALUE SPACES.
   ```

   This will allow the table to accommodate 300 records (each record contains 72 characters). The numeric value specified for this PIC clause must be 72 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00047300) from:

   ```
   02  SITE-RECORD REDEFINES SITE-BLOCK OCCURS 200 TIMES.
   ```

   to:

   ```
   02  SITE-RECORD REDEFINES SITE-BLOCK OCCURS 300 TIMES.
   ```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPMSTR (AQ0230) - MASTER FILE DETAILED REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00035800) from:

```
77  NBR-OF-SITES           PIC 999 COMP SYNC VALUE 200.
```

   to:

```
77  NBR-OF-SITES           PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00154600) from:

```
02  SITE-BLOCK             PIC X(16000) VALUE SPACES.
```

   to:

```
02  SITE-BLOCK             PIC X(24000) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 80 characters). The numeric value specified for the PIC clause must be 80 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00154700) from:

```
02  SITE-CODE-TABLE REDEFINES SITE-BLOCK OCCURS 200 TIMES.
```

   to:

```
02  SITE-CODE-TABLE REDEFINES SITE-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPSMEX (AQ0340) - SITE EXCEPTION REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00011900) from:

```
     77  NBR-OF-SITES              PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  NBR-OF-SITES              PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00017100) from:

```
     02  SITE-BLOCK                PIC X(2400) VALUE SPACES.
```

   to:

```
     02  SITE-BLOCK                PIC X(3600) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 12 characters). The numeric value specified for this PIC clause must be 12 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00017200) from:

```
     02  SITE-CODE-KEY REDEFINES SITE-BLOCK OCCURS 200 TIMES.
```

   to:

```
     02  SITE-CODE-KEY REDEFINES SITE-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPSMEX (AQ0340) also contains a table for site codes that appear on the AQDHS-II master file but not on the AQDHS-II site file. It is not mandatory to change the size of this table when changing the size of the AQDHS-II site file table. However, the procedure is as follows:

1. Change the VALUE clause of the following program statement (on or about sequence number 00012000) from:

   ```
   77  MISSING-SITE-MAX       PIC 999 COMP SYNC VALUE 200.
   ```

   to:

   ```
   77  MISSING-SITE-MAX       PIC 999 COMP SYNC VALUE 300.
   ```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00017600) from:

   ```
   02  MISSING-BLOCK          PIC X(16000) VALUE SPACES.
   ```

   to:

   ```
   02  MISSING-BLOCK          PIC X(24000) VALUE SPACES.
   ```

   This will allow the table to accommodate 300 records (each record contains 80 characters). The numeric value specified for this PIC clause must be 80 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statements (on or about sequence numbers 00017700-00017800) from:

   ```
   02  MISSING-ENTRIES REDEFINES MISSING-BLOCK
                            OCCURS 200 TIMES.
   ```

   to:

   ```
   02  MISSING-ENTRIES REDEFINES MISSING-BLOCK
                            OCCURS 300 TIMES.
   ```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

C.4 CHANGING THE PARAMETER TABLE SIZE

Whenever it is necessary to change the size (number of entries) of the parameter table, all programs listed in this section must be modified accordingly. The user must complete all changes listed for a given program unless otherwise specified. The user should also refer to the special instructions at the beginning of this Appendix when modifying programs.

ACVUNIT (AQ0050) - UNITS CODE CONVERSION PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00012600) from:

```
77  NBR-OF-PARMS            PIC 999 COMP SYNC VALUE 200.
```

to:

```
77  NBR-OF-PARMS            PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00021300) from:

```
02  PARM-BLOCK              PIC X(6400) VALUE SPACES.
```

to:

```
02  PARM-BLOCK              PIC X(9600) VALUE SPACES.
```

This will allow the table to accommodate 300 records (each record contains 32 characters). The numeric value specified for this PIC clause must be 32 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00021400) from:

```
02  PARM-TABLE REDEFINES PARM-BLOCK OCCURS 200 TIMES.
```

to:

```
02  PARM-TABLE REDEFINES PARM-BLOCK OCCURS 300 TIMES.
```

The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ACVUNIT (AQ0050) also contains a table for parameter codes that appear on the AQDHS-II master file but not on the AQDHS-II parameter file. It is not mandatory to change the size of this table when changing the size of the AQDHS-II parameter file table. However, the procedure for changing it is as follows:

1. Change the VALUE clause of the following program statement (on or about sequence number 00014800) from:

   ```
   77  TABLE-MAX                PIC 999 COMP SYNC VALUE 200.
   ```

   to:

   ```
   77  TABLE-MAX                PIC 999 COMP SYNC VALUE 300.
   ```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00023000) from:

   ```
   02  BAD-PARM-BLOCK           PIC X(2000) VALUE SPACES.
   ```

   to:

   ```
   02  BAD-PARM-BLOCK           PIC X(3000) VALUE SPACES.
   ```

   This will allow the table to accommodate 300 records (each record contains 10 characters). The numeric value specified for this PIC clause must be 10 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statements (on or about sequence numbers 00023100-00023200) from:

   ```
   02  BAD-PARM-TABLE REDEFINES BAD-PARM-BLOCK
                           OCCURS 200 TIMES.
   ```

   to:

   ```
   02  BAD-PARM-TABLE REDEFINES BAD-PARM-BLOCK
                           OCCURS 300 TIMES.
   ```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

AEDMSTR (AQ0060) - MASTER FILE TRANSACTION EDIT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00038500) from:

```
    77  NBR-OF-PARMS            PIC 999 COMP SYNC VALUE 200.
```

   to:

```
    77  NBR-OF-PARMS            PIC 999 COMP SYNC VALUE 300.
```

   This will increase the limit of table entries to 300.

2. Change the OCCURS clause of the following program statement (on or about sequence number 00144300) from:

```
    03  PARM-CODE-KEY-TABLE     OCCURS 200 TIMES.
```

   to:

```
    03  PARM-CODE-KEY-TABLE     OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

AEMPARM (AQ0070) - PARAMETER FILE MAINTENANCE PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00016400) from:

```
     77  BINARY-200                        PIC 999 COMP SYNC VALUE 200.
```

   to:

```
     77  BINARY-300                        PIC 999 COMP SYNC VALUE 300.
```

   If the number of output parameter file records exceeds the value of this data item, a warning message will be generated. After receiving this warning message, the user should make the necessary changes to other programs that access the AQDHS-II parameter file.

ARPINVP (AQ0290) - INVENTORY BY POLLUTANT REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00012200) from:

```
    77  POLL-MAX                      PIC 999 COMP SYNC VALUE 200.
```

   to:

```
    77  POLL-MAX                      PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00017200) from:

```
    02  POLL-BLOCK                    PIC X(7400) VALUE SPACES.
```

   to:

```
    02  POLL-BLOCK                    PIC X(11100) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 37 characters). The numeric specified for this PIC clause must be 37 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00017300) from:

```
    02  POLL-RECORD REDEFINES POLL-BLOCK OCCURS 200 TIMES.
```

   to:

```
    02  POLL-RECORD REDEFINES POLL-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPINVS (AQ0280) - INVENTORY BY SITE REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00013500) from:

```
77  NBR-OF-PARMS                PIC 999 COMP SYNC VALUE 200.
```

to:

```
77  NBR-OF-PARMS                PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00037000) from:

```
02  PARM-BLOCK PIC X(7800) VALUE SPACES.
```

to:

```
02  PARM-BLOCK PIC X(11700) VALUE SPACES.
```

This will allow the table to accommodate 300 records (each record contains 39 characters). The numeric value specified for this PIC clause must be 39 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00037100) from:

```
02  PARM-TABLE REDEFINES PARM-BLOCK OCCURS 200 TIMES.
```

to:

```
02  PARM-TABLE REDEFINES PARM-BLOCK OCCURS 300 TIMES.
```

The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPMSST (AQ0270) - STATISTICAL REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00019400) from:

```
    77  PARM-MAX                      PIC 999 COMP SYNC VALUE 200.
```

   to:

```
    77  PARM-MAX                      PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00048100) from:

```
    02  PARM-BLOCK                    PIC X(23800) VALUE SPACES.
```

   to:

```
    02  PARM-BLOCK                    PIC X(35700) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 119 characters). The numeric value specified for this PIC clause must be 119 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00048200) from:

```
    02  PARM-RECORD REDEFINES PARM-BLOCK OCCURS 200 TIMES.
```

   to:

```
    02  PARM-RECORD REDEFINES PARM-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPMSTR (AQ0230) - MASTER FILE DETAILED REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00035700) from:

```
    77  NBR-OF-PARMS                     PIC 999 COMP SYNC VALUE 200.
```

   to:

```
    77  NBR-OF-PARMS                     PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00126900) from:

```
    02  PARM-BLOCK                       PIC X(24800) VALUE SPACES.
```

   to:

```
    02  PARM-BLOCK                       PIC X(37200) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 124 characters). The numeric value specified for this PIC clause must be 124 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00127000) from:

```
    02  PARM-CODE-TABLE REDEFINES PARM-BLOCK OCCURS 200 TIMES.
```

   to:

```
    02  PARM-CODE-TABLE REDEFINES PARM-BLOCK OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPPMEX (AQ0330) - PARAMETER EXCEPTION REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00013500) from:

   ```
   77  NBR-OF-PARMS                    PIC 999 COMP SYNC VALUE 200.
   ```

   to:

   ```
   77  NBR-OF-PARMS                    PIC 999 COMP SYNC VALUE 300.
   ```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00025700) from:

   ```
   02  PARM-BLOCK                      PIC X(1800) VALUE SPACES.
   ```

   to:

   ```
   02  PARM-BLOCK                      PIC X(2700) VALUE SPACES.
   ```

   This will allow the table to accommodate 300 records (each record contains 9 characters). The numeric value specified for this PIC clause must be 9 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00025900) from:

   ```
   03  PARM-CODE-ENTRY                 OCCURS 200 TIMES.
   ```

   to:

   ```
   03  PARM-CODE-ENTRY                 OCCURS 300 TIMES.
   ```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ARPPMEX (AQ0330) also contains a table for parameter codes that appear on the AQDHS-II master file but not on the AQDHS-II parameter file. It is not mandatory to change the size of this table when changing the size of the AQDHS-II parameter file table. However, the procedure for changing it is as follows:

1. Change the VALUE clause of the following program statement (on or about sequence number 00013400) from:

   ```
   77  NBR-OF-EXCP                       PIC 999 COMP SYNC VALUE 200.
   ```

   to:

   ```
   77  NBR-OF-EXCP                       PIC 999 COMP SYNC VALUE 300.
   ```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00026900) from:

   ```
   02  NEW-BLOCK                         PIC X(1800) VALUE SPACES.
   ```

   to:

   ```
   02  NEW-BLOCK                         PIC X(2700) VALUE SPACES.
   ```

   This will allow the table to accommodate 300 records (each record contains 9 characters). The numeric value specified for this PIC clause must be 9 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00027100) from:

   ```
   03  NEW-ENTRY                         OCCURS 200 TIMES.
   ```

   to:

   ```
   03  NEW-ENTRY                         OCCURS 300 TIMES.
   ```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

ASTPRLM (AQ0190) - PRELIMINARY STATISTICS PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00017500) from:

```
    77  NBR-OF-PARMS                    PIC 999 COMP SYNC VALUE 200.
```

   to:

```
    77  NBR-OF-PARMS                    PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statements (on or about sequence numbers 00044900-00045000) from:

```
    02  PARM-TABLE-ZEROED               PIC X(3800)
                                        VALUE LOW-VALUES.
```

   to:

```
    02  PARM-TABLE-ZEROED               PIC X(5700)
                                        VALUE LOW-VALUES.
```

   This will allow the table to accommodate 300 records (each record contains 19 characters). The numeric value specified for this PIC clause must be 19 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statement (on or about sequence number 00045300) from:

```
    03  PARM-TABLE-ENTRY                OCCURS 200 TIMES.
```

   to:

```
    03  PARM-TABLE-ENTRY                OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

C.5 CHANGING THE PARAMETER STANDARDS TABLE SIZE

Whenever it is a necessary to change the size (number of entries) of the parameter standards table, all programs listed in this section must be modified accordingly. The user must complete all changes listed for a given program unless otherwise specified. The user should also refer to the special instructions at the beginning of this Appendix when modifying programs.

Note that 100, not 200, is the current limit for the number of entries in the parameter standards tables.

ARPMSTR (AQ0230) - MASTER FILE DETAILED REPORT PROGRAM

1. Change the VALUE clause of the following program statement (on or about sequence number 00035900) from:

```
    77  NBR-OF-STANDARDS              PIC 999 COMP SYNC VALUE 100.
```

   to:

```
    77  NBR-OF-STANDARDS              PIC 999 COMP SYNC VALUE 300.
```

2. Change the PICTURE clause of the following program statement (on or about sequence number 00156400) from:

```
    02  STANDARDS-BLOCK               PIC X(11200) VALUE SPACES.
```

   to:

```
    02  STANDARDS-BLOCK               PIC X(33600) VALUE SPACES.
```

   This will allow the table to accommodate 300 records (each record contains 112 characters). The numeric value specified for this PIC clause must be 112 times the numeric value specified for the VALUE clause in Step 1.

3. Change the OCCURS clause of the following program statements (on or about sequence numbers 00156500-00156600) from:

```
    02  STANDARDS-TABLE REDEFINES STANDARDS-BLOCK
                                  OCCURS 100 TIMES.
```

   to:

```
    02  STANDARDS-TABLE REDEFINES STANDARDS-BLOCK
                                  OCCURS 300 TIMES.
```

   The numeric value specified for this OCCURS clause must be the same as that specified for the VALUE clause in Step 1.

APPENDIX D - SAMPLE LOAD SHEETS

This appendix provides sample load sheets which can be reproduced by the user to aid in the generation of transactions for the parameter file, site file, parameter standards file, and master file. A sample load sheet is also provided for retrieval language specifications.

AGENCY________

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
PARAMETER TRANSACTIONS

BY ________

DATE ________

PAGE __ OF __

	PARM	METH	UNIT	DP	MIN DETECT	PARAMETER DESCRIPTION		COLLECTION METHOD		ACTION
1	2	7	9	11	12	16	45	46	70	80
1										

	PARM	METH	UNIT	ANALYSIS DESCRIPTION		UNITS DESCRIPTION		ACTION
1	2	7	9	11	35	36	65	80
2								

	PARM	METH	UNIT	STD UC	STANDARD UNITS CONVERSION FACTOR		USER UC	USER UNITS CONVERSION FACTOR		ACTION
1	2	7	9	11	13	21	22	24	32	80
3										

	PARM	METH	UNIT	DP	MIN DETECT	PARAMETER DESCRIPTION		COLLECTION METHOD		ACTION
1	2	7	9	11	12	16	45	46	70	80
1										

	PARM	METH	UNIT	ANALYSIS DESCRIPTION		UNITS DESCRIPTION		ACTION
1	2	7	9	11	35	36	65	80
2								

	PARM	METH	UNIT	STD UC	STANDARD UNITS CONVERSION FACTOR		USER UC	USER UNITS CONVERSION FACTOR		ACTION
1	2	7	9	11	13	21	22	24	32	80
3										

	PARM	METH	UNIT	DP	MIN DETECT	PARAMETER DESCRIPTION		COLLECTION METHOD		ACTION
1	2	7	9	11	12	16	45	46	70	80
1										

	PARM	METH	UNIT	ANALYSIS DESCRIPTION		UNITS DESCRIPTION		ACTION
1	2	7	9	11	35	36	65	80
2								

	PARM	METH	UNIT	STD UC	STANDARD UNITS CONVERSION FACTOR		USER UC	USER UNITS CONVERSION FACTOR		ACTION
1	2	7	9	11	13	21	22	24	32	80
3										

	PARM	METH	UNIT	DP	MIN DETECT	PARAMETER DESCRIPTION		COLLECTION METHOD		ACTION
1	2	7	9	11	12	16	45	46	70	80
1										

	PARM	METH	UNIT	ANALYSIS DESCRIPTION		UNITS DESCRIPTION		ACTION
1	2	7	9	11	35	36	65	80
2								

	PARM	METH	UNIT	STD UC	STANDARD UNITS CONVERSION FACTOR		USER UC	USER UNITS CONVERSION FACTOR		ACTION
1	2	7	9	11	13	21	22	24	32	80
3										

EPA (DUR) 429

AGENCY________

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
SITE TRANSACTIONS

BY ____________
DATE ____________
PAGE ____ OF ________

STATE	AREA CODE	SITE CODE	AGENCY	PROJECT	AQCR CODE	COUNTY CODE	SLAMS	SITE DESCRIPTION
1	3	7	10	11	13	16	20	21 … 80

EF UR) 431

AGENCY__________

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
PARAMETER STANDARDS TRANSACTIONS

BY________
DATE______
PAGE___OF___

PARAMETER CODE	TYPE	STD NBR	FLAG	UNIT CODE	STANDARD DESCRIPTION
1	6	7	9	10	12 … 61

EPA (DUR) 430

AGENCY________
SITE NAME________
PARAMETER________

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
FORMAT 1 – LESS THAN DAILY SAMPLING INTERVAL

BY________
DATE________
PAGE____OF____

	STATE	AREA	SITE	AGEN	PROJ	TIME	YEAR
1	2	4	8	11	12	14	15 16
1							

PARAMETER	METH	UNITS	DP
23	28	30	32

STATUS	ACTION
79	80

MO	DAY	START HOUR
17	19	21 22

READING 1	READING 2	READING 3	READING 4	READING 5	READING 6	READING 7	READING 8
33	37	41	45	49	53	57	61 64

EPA (DUR) 427

AGENCY_____
SITE______

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
FORMAT 2 – MULTIPLE PARAMETERS
DAILY OR GREATER SAMPLING INTERVAL

BY________
DATE________
PAGE____ OF___

	STATE	AREA	SITE	AGEN	PROJECT	TIME	YEAR	MONTH
1	2	4	8	11	12	14	15	17 18
2								

STATUS	ACTION
79	80

PARAMETER CODE	PARAMETER CODE	PARAMETER CODE	PARAMETER CODE
23 27	37 41	51 55	65 69

METHOD	UNITS	DP	METHOD	UNITS	DP	METHOD	UNITS	DP	METHOD	UNITS	DP
28	30	32	42	44	46	56	58	60	70	72	74

DAY	START HOUR	READING	READING	READING	READING
19 20	21 22	33 36	47 50	61 64	75 78
0,1					
0,2					
0,3					
0,4					
0,5					
0,6					
0,7					
0,8					
0,9					
1,0					
1,1					
1,2					
1,3					
1,4					
1,5					
1,6					
1,7					
1,8					
1,9					
2,0					
2,1					
2,2					
2,3					
2,4					
2,5					
2,6					
2,7					
2,8					
2,9					
3,0					
3,1					

EPA (DUR) 426

AGENCY________
SITE__________

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
FORMAT 2 – COMPOSITE DATA

BY ______________
DATE _____________
PAGE ______OF_____

	STATE	AREA	SITE	AGEN	PROJECT	TIME	YEAR	PERIOD	NUMBER OF SAMPLES	COMP TYPE	SAM PLE TIME
1 2	2	4	8	11	12	14 C	15	17 18	19	21	22

STATUS	ACTION
79	80

PARAMETER CODE	PARAMETER CODE	PARAMETER CODE	PARAMETER CODE
23 27	37 41	51 55	65 69

METHOD	UNITS	DP	METHOD	UNITS	DP	METHOD	UNITS	DP	METHOD	UNITS	DP
28	30	32	42	44	46	56	58	60	70	72	74

READING	READING	READING	READING
33 36	47 50	61 64	75 78

EPA (DUR) 424

AGENCY ______

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS–II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
FORMAT 3 – MULTIPLE SITE (STATION)
DAILY OR GREATER SAMPLING INTERVAL

BY ______
DATE ______
PAGE ___ OF ___

	STATE	AGEN	PROJECT	TIME	PARAMETER CODE	METHOD	UNITS	DP	YEAR	MONTH
1	2	4	5 6	7	8 12	13	15	17	18	20
3										

STATUS	ACTION
79	80

START HOUR	AREA	SITE	START HOUR	AREA	SITE	START HOUR	AREA	SITE	START HOUR	AREA	SITE
24	26 29	30 32	37	39 42	43 45	50	52 55	56 58	63	65 68	69 71

DAY	READING	READING	READING	READING
22 23	33 36	46 49	59 62	72 75
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
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30				
31				

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AGENCY_____
PURPOSE_____

AIR QUALITY DATA HANDLING SUBSYSTEM (AQDHS—II)
COMPREHENSIVE DATA HANDLING SYSTEM (CDHS)
RETRIEVAL SPECIFICATIONS

BY_____
DATE_____
PAGE___OF___

	LANG KEYWD	COBOL MEMBER NAME	MODE KEYWORD	LIST OPTION	USER-DEFINED DATA MEMBER NAME	USER-DEFINED SUBROUTINE MEMBER NAME	GENERATED LOAD MODULE NAME
1 8	10 13	16 23	25 32	34 39	43 50	52 59	61 67
$$SELECT							

VALID DATA NAMES

NAME	LENGTH	TYPE	NAME	LENGTH	TYPE	NAME	LENGTH	TYPE
ACTION-CODE	1	N	FORM-CODE	1	N	PROJECT	2	N
AGENCY	1	A	IDENT-KEY	37	A	RECORD-STATUS-FLAG	1	A
AQCR	3	N	KEY-1	22	A	SITE	3	N
AREA-CODE	4	N	KEY-2	9	N	SLAMS-ID	1	A
COMPOSITE-KEY-3	6	N	KEY-3	6	N	START-HOUR	2	N
COMPOSITE-PERIOD	2	N	METHOD-CODE	2	N	STATE	2	A
COMPOSITE-SAMPLES	2	N	MONTH	2	N	STATUS-FLAG*	1	A
COMPOSITE-TIME-CODE	1	A	NBR-OF-READINGS	2	N	TIME-CODE	1	A
COMPOSITE-TYPE	1	N	PARAMETER-CODE	5	N	UNIT-CODE	2	N
COUNTY-CODE	4	N				YEAR	2	N
DATA-FIELD*		N				* REPEATING DATA NAME		
DAY-CODE	2	N						

VALID VALUES FOR
NEGATION FLAG (NF): BLANK, N
RELATIONAL OPERATOR (RO):
= EQUAL
> GREATER THAN
< LESS THAN
BOOLEAN OPERATORS (BO):
AND, OR, BLANK
TYPE: N= NUMERIC
A= ALPHANUMERIC

SUBJECT NAME	NF	RO	OBJECT NAME (LITERALS MUST BE ENCLOSED IN SINGLE QUOTES)	BO
1 22	24	26	28 67	69 71

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NOTE: PARENTHESES MUST BE BALANCED

APPENDIX E - AQDHS-II File Specifications

INTRODUCTION

This appendix presents a cross-reference of the AQDHS-II files and the programs that read or write them; it also discusses the blocking factors of these files.

The files used by AQDHS-II may be categorized as follows:

1) Permanent files (master file, parameter file, parameter standards file, site file). These are the essential files of AQDHS-II.
2) FORTRAN-compatible files (FORTRAN-compatible master file, FORTRAN-compatible parameter file). These files enable the user to access data from the master and parameter files with user-written programs compiled by any ANS FORTRAN compiler.
3) SAROAD-report files. These are files placed on magnetic tape and submitted to EPA for inclusion in the SAROAD data base.
4) Temporary Files. These files are passed between various AQDHS-II programs and are not permanently retained.
5) Unit Record Files (print files, input card files, and output skeleton transaction card files).
6) Library Files (program source module library, program load module library, and procedure library). These files are maintained as partitioned data sets on IBM/OS systems.

CROSS REFERENCE OF FILES AND PROGRAMS

Table E-1 is a cross-reference of AQDHS-II files and programs that read or write them. This cross-reference is provided to assist the user in modifying a file's blocking factor or otherwise modifying the characteristics of a file.

Table E-1. Cross-Reference of Files and Programs

File	Programs which Process the File	Usage Input/Output
Permanent Files		
Archived Master File*	AMSARCH (AQ0215)	Output
Master File	ACVANOM (AQ0040)	Input/Output
	ACVMFOR (AQ0020)	Input
	ACVUNIT (AQ0050)	Input
	AFMMSTR (AQ0100)	Input/Output
	AMSARCH (AQ0215)	Input/Output
	AMSMERG (AQ0210)	Input/Output
	ARPDUMP (AQ0310)	Input
	ARPINVP (AQ0290)	Input
	ARPINVS (AQ0280)	Input
	ARPMSBR (AQ0300)	Input
	ARPMSTR (AQ0230)	Input
	ARPPMEX (AQ0330)	Input
	ARPSARD (AQ0220)	Input/Output
	ARPSMEX (AQ0340)	Input
	ARTGENR (AQ0120)	Input
	ASRMSTR (AQ0140)	Input/Output
	ASTPRLM (AQ0190)	Input
Parameter File	ACVANOM (AQ0040)	Input
	ACVPFOR (AQ0030)	Input
	ACVUNIT (AQ0050)	Input
	AEDMSTR (AQ0060)	Input

---

*The archived master file may be used instead of the master file in any program that uses the master file as input.

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Table E-1 - Continued. Cross-Reference of Files and Programs

File	Programs Which Process the File	Usage Input/Output
Parameter File (continued)	AEMPARM (AQ0070)	Input/Output
	ARPINVP (AQ0290)	Input
	ARPINVS (AQ0280)	Input
	ARPMSST (AQ0270)	Input
	ARPMSTR (AQ0230)	Input
	ARPPARM (AQ0240)	Input
	ARPPMEX (AQ0330)	Input
	ASTPRLM (AQ0190)	Input
Parameter Standards File	AEMSTND (AQ0090)	Input/Output
	ARPMSTR (AQ0230)	Input
	ARPSTND (AQ0250)	Input
Site File	AEDMSTR (AQ0060)	Input
	AEMSITE (AQ0080)	Input/Output
	ARPINVP (AQ0290)	Input
	ARPINVS (AQ0280)	Input
	ARPMSST (AQ0270)	Input
	ARPMSTR (AQ0230)	Input
	ARPSITE (AQ0260)	Input
	ARPSMEX (AQ0340)	Input
FORTRAN-Compatible Files		
FORTRAN-Compatible Master File	ACVMFOR (AQ0020)	Output
FORTRAN-Compatible Parameter File	ACVPFOR (AQ0030)	Output

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Table E-1 - Continued. Cross-Reference of Files and Programs

File	Programs Which Process the File	Usage Input/Output
SAROAD Report Files		
SAROAD Transaction Format Add File	ARPSARD (AQ0220)	Output
SAROAD Transaction Format Change File	ARPSARD (AQ0220)	Output
Temporary Files		
Answer File*	ACVUNIT (AQ0050)	Output
	ARTGENR (AQ0120)	Output
File of Data to be Screened for Anomalies	ACVANOM (AQ0040)	Output
	ARPANOM (AQ0320)	Input
Generated Retrieval Program Source Module	ARTLNGP (AQ0110)	Output
Master File Internal Transactions	AEDMSTR (AQ0060)	Output
	ASRINTR (AQ0130)	Input
Preliminary Statistics File	ASTMSST (AQ0200)	Input
	ASTPRLM (AQ0190)	Output
Raw Data File	ASTMSST (AQ0200)	Input
	ASTPRLM (AQ0190)	Output
Sliding Average Answer File	ARTGENR (AQ0120)	Output
	ASTSLAV (AQ0180)	Input
Sliding Average Values File	ARPMSTR (AQ0230)	Input
	ASTSLAV (AQ0180)	Output

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Table E-1 - Continued. Cross-Reference of Files and Programs

File	Programs Which Process the File	Usage Input/Output
Sort Work Files	ARPSITE (AQ0260)	Input/Output
	ASRINTR (AQ0130)	Input/Output
	ASRMSTR (AQ0140)	Input/Output
	ASRPARM (AQ0150)	Input/Output
	ASRSITE (AQ0160)	Input/Output
	ASRSTND (AQ0170)	Input/Output
Sorted Master File Internal Transactions	AFMMSTR (AQ0100)	Input
	ASRINTR (AQ0130)	Output
Sorted Parameter File Transactions	AEMPARM (AQ0070)	Input
	ASRPARM (AQ0150)	Output
Sorted Parameter Standards File Transactions	AEMSTND (AQ0090)	Input
	ASRSTND (AQ0170)	Output

---

*An answer file may be used instead of the master file in any program that uses the master file as input.

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Table E-1 - Continued. Cross-Reference of Files and Programs

File	Programs Which Process the File	Usage Input/Output
Sorted Site File Transactions	AEMSITE (AQ0080)	Input
	ASRSITE (AQ0160)	Output
Statistics File	ARPMSST (AQ0270)	Input
	ASTMSST (AQ0200)	Output
Unit Record Files		
Master File Transactions	ACVSARD (AQ0010)	Output
	AEDMSTR (AQ0060)	Input
Parameter File Transactions	ASRPARM (AQ0150)	Input
Parameter Standards File Transactions	ASRSTND (AQ0170)	Input
SAROAD Transactions	ACVSARD (AQ0010)	Input
Site File Transactions	ASRSITE (AQ0160)	Input
Skeleton Master File Transactions	ARPANOM (AQ0320)	Output
Skeleton Parameter File Transactions	ARPPMEX (AQ0330)	Output
Skeleton Site File Transactions	ARPSMEX (AQ0340)	Output
Retrieval Specifications	ARTLNGP (AQ0110)	Input
Option Card Files	ACVANOM (AQ0040)	Input
	ACVSARD (AQ0010)	Input
	ACVUNIT (AQ0050)	Input
	AEDMSTR (AQ0060)	Input
	AEMPARM (AQ0070)	Input
	AFMMSTR (AQ0100)	Input
	AMSARCH (AQ0215)	Input
	ARPDUMP (AQ0310)	Input
	ARPMSST (AQ0270)	Input

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Table E-1 - Continued. Cross-Reference of Files and Programs

File	Programs Which Process the File	Usage Input/Output
	ARPMSTR (AQ0230)	Input
	ARPSARD (AQ0220)	Input
	ARPSMEX (AQ0340)	Input
	ASRMSTR (AQ0140)	Input
	ASTPRLM (AQ0190)	Input
	ASTSLAV (AQ0180)	Input
Print Files	All Programs	Output
Library Files		
Program Source Library	ARTLNGP (AQ0110)	Input

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BLOCKING FACTORS

The blocking factor of a file is defined as the number of logical records that are contained in one physical record or block. A file's blocking factor determines how efficiently it can be stored on disk or magnetic tape. It also affects the efficiency of any program that uses the file.

Table E-2 lists for each AQDHS-II file the recommended blocking factor for storage on IBM 3330 disk units, IBM 2314 disk units, and magnetic tape. The recommended blocking factors were primarily established to optimize storage efficiency for these two models of disk and to optimize processing efficiency for tape files. Each user may determine and implement his own blocking factors; indeed, a user who utilizes a medium of storage other than the IBM 3330 disk unit, 2314 disk unit, or magnetic tape should establish blocking factors suitable for his storage medium. A blank column has been provided in Table E-2 for the user to enter the locally-defined blocking factors.

As released by NADB, AQDHS-II utilizes the recommended blocking factors for IBM 3330 disk units. Additionally, all unit record files have a blocking factor of one.

To change the blocking factor for a file other than a library file the user must accomplish the following: (Assistance in accomplishing these tasks may be obtained from the user's systems personnel or NADB.)

1) Modify the source module of each COBOL program that reads or writes the file to reflect the new blocking factor (see Table E-1). For all files other than unit record files, the RECORD CONTAINS clause in the file's FD statement must be modified. For unit record files, no RECORD CONTAINS clause appears in the source module of the COBOL programs; however, a comment line is provided for insertion of a

Table E-2. Blocking Factors of AQDHS-II Files

File	Characters per record	Recommended Records per Block for Files on Disk: IBM 3330 Disk (13,030 characters per track)*	Recommended Records per Block for Files on Disk: IBM 2314 Disk (7,294 characters per track)	Recommended Records per Block for Files on Magnetic Tape	Records per Block used Locally
Permanent Files					
Archived Master File	63-243	8	8	10	
Master File	63-243	8	8	10	
Parameter File	146	11	12	15	
Parameter Standards File	112	23	13	20	
Site File	80	18	13	25	
FORTRAN-Compatible Files					
FORTRAN-Compatible Master File	118	22	15	20	
FORTRAN-Compatible Parameter File	20	36	45	50	

---

*Blocking factors used by AQDHS-II as released by NADB

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Table E-2 - Continued. Blocking Factors of AQDHS-II Files

File	Characters per Record	Recommended Records per Block for Files on Disk		Recommended Records per Block for Files on Magnetic Tape	Records per Block used Locally
		IBM 3330 Disk (13,030 characters per track)*	IBM 2314 Disk (7,294 characters per track)		
SAROAD Report Files					
SAROAD Add File	80	N/A	N/A	50*	
SAROAD Change File	80	N/A	N/A	50*	
Temporary Files					
Answer File	63-243	8	8	10	
File of Data to be Screened for Anomalies	114	19	15	25	
Generated Retrieval Program Source Module	80	42	42	50	

---

*Blocking factors used by AQDHS-II as released by NADB

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Table E-2 - Continued. Blocking Factors of AQDHS-II Files

File	Characters per Record	Recommended Records per Block for Files on Disk		Recommended Records per Block for Files on Magnetic Tape	Records per Block used Locally
		IBM 3330 Disk (13,030 characters per track)*	IBM 2314 Disk (7,294 characters per track)		
Master File Internal Transactions	91	20	20	25	
Preliminary Statistics File	97	19	25	25	
Raw Data File	112	23	13	25	
Sliding Average Answer File	63-243	8	8	10	
Sliding Average Values File	63-243	8	8	10	
Sort Work Files	varies	**	**	**	
Sorted Master File Internal Transactions	91	20	20	25	

*Blocking factors used by AQDHS-II as released by NADB

**Blocking factors determined by COBOL sort package

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Table E-2 - Continued. Blocking Factors of AQDHS-II Files

File	Characters per Record	Recommended Records per Block for Files on Disk		Recommended Records per Block for Files on Magnetic Tape	Records per Block used Locally
File		IBM 3330 Disk (13,030 characters per track)*	IBM 2314 Disk (7,294 characters per track)		
Sorted Parameter File Transactions	80	18	13	25	
Sorted Parameter Standards File Transactions	80	18	13	25	
Statistics File	100	13	18	25	
Sorted Site File Transactions	80	18	13	25	
Library Files					
Program Source Library	80	42	42	50	
Program Load Library	N/A	N/A	N/A	N/A	
Procedure Library	80	100	100	100	

*Blocking factors used by AQDHS-II as released by NADB

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RECORD CONTAINS clause. When changing the blocking factor for unit record files, this comment line should be replaced by the RECORD CONTAINS clause (to maintain the line number integrity of the source module).

2) Compile and link edit each COBOL program that is modified.
3) Modify the cataloged procedure that executes any FORTRAN program that uses the file. (See Table E-1.) The DCB parameters for the affected file should be changed to reflect the new blocking factor. Note: The AQDHS-II programs coded in FORTRAN are ARPANOM (AQ0320) and ASTMSST (AQ0200); they are executed by procedures AQRPM45 and AQRPM10, respectively.
4) If the above actions are taken to change the blocking factor of a file prior to the creation of any copies of the file, no further action is necessary; the file will be created with the blocking factors that have been specified. However, if there are existing copies of the file, they must be reblocked before they can be used. This reblocking can be accomplished by IBM users with the utility IEBGENER. An example of a run stream to reblock a disk file is shown in Figure E-1.

To change the blocking factor of the program source module library, the user must modify program ARTLNGP (AQ0110) as discussed in step 1 above, compile and link edit ARTLNGP (AQ0110), and reblock the program source module library (see Figure E-2). IBM users should not reblock the program load module library or procedure library.

```
 1. // EXEC     PGM=IEBGENER
 2. //SYSPRINT DD SYSOUT=A
 3. //SYSUT1   DD DISP=OLD,
 4. //         DSNAME='file name'
 5. //SYSUT2   DD DISP=(NEW,CATLG,DELETE),
 6. //         DSNAME='file name',
 7. //         SPACE=(TRK,(10,1),RLSE),
 8. //         UNIT=DISK,
 9. //         VOL=('volume/serial information'),
10. //         DCB=('DCB information')
11. //SYSIN    DD DUMMY
```

<u>User-supplied JCL</u>:

Line 4. Replace 'file name' with the name of the file to be reblocked.
Line 6. Replace 'file name' with the name of the reblocked file.
Line 7. Space allocation is dependent upon the file size, and it may be necessary to increase the space allocation.
Line 9. Replace 'volume/serial information' with the volume and serial specifications of the reblocked file.
Line 10. Replace 'DCB information' with the DCB information specifying the the new blocking factor.

Figure E-1. Sample Job Stream to Reblock a Permanent or FORTRAN-Compatible AQDHS-II File Stored on Disk.

```
1.  // EXEC    PGM=IEBCOPY
2.  //SYSPRINT DD SYSOUT=A
3.  //SYSUT1   DD DISP=OLD,
4.  //         DSNAME='library name'
5.  //SYSUT2   DD DISP=(NEW,CATLG,DELETE),
6.  //         DSNAME='library name',
7.  //         SPACE=(TRK,(10, 1),RLSE),
8.  //         UNIT=DISK,
9.  //         VOL=('volume/serial information'),
10. //         DCB=('DCB information')
11. //SYSIN    DD *
12.   COPY     OUTDD=SYSUT2,INDD=SYSUT1
13  /*
```

<u>User-supplied JCL</u>

Line 4.	Replace 'library name' with the name of the program source module library to be reblocked.
Line 6.	Replace 'library name' with the name of the reblocked library.
Line 7.	Space allocation is dependent upon the file size, and it may be necessary to increase the space allocation.
Line 9.	Replace 'volume/serial information' with the volume and serial specifications of the reblocked library.
Line 10.	Replace 'DCB information' with the DCB information specifying the new blocking factor.

Figure E-2. Sample Job Stream to Reblock an AQDHS-II Program Source Module Library.

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